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EXPLORING VALUE PROPOSITIONS AND VALUE DRIVERS IN TASK ORIENTED INFORMATION INTENSIVE ONLINE COMMUNITIES: CASE STUDY - METAL DETECTING FIND DATABASE

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Digitaalisten kuluttajapalveluiden menestystekijöiden ja kehitysviitekehysten tutkimus on yhä suositumpi aihe tietojärjestelmien tutkimuksessa palvelutieteissä. Tämä Pro Gradu -tutkimus testaa Consumer Information System (CIS) -palvelunkehittämismallia ja Critical Success Chain (CSC) -metodologiaa tulkitsevassa laadullisessa kenttätutkimuksessa (n=24), jossa tavoitteena on vastata tutkimuskysymykseen: *Mitkä ovat kuluttajapohjaisten nettiyhteisöpalveluiden arvonluonnin lupaukset ja arvoajurit?* Tämän lisäksi tavoitteena on tuottaa perusteltuja vaatimuksia uuden metallinpaljastinharrastajien löytötietokantapalvelun kehittämiseen. Kaksi täydentävää tutkimuskysymystä ovat: *1) Mitkä ovat löytötietokantapalvelun välittömät ja perimmäiset arvoajurit? 2) Millaisia arvolupauksia löytötietokannan tulee tarjota käyttäjilleen?* Tutkimuksen tulokset osoittavat, että löytötietokannan käyttöä motivoi ensisijaisesti rationaaliset syyt, kuten *Ajan ja vaivan säästö, Parantunut tehokkuus, Historiatutkimuksen edesauttaminen,* sekä *Vuorovaikutus muiden käyttäjien kanssa*. Perimmäisinä motivaattoreina toimivat rationaaliset ja tunneperäiset syyt. Tällaisia ovat *Kiinnostus historiaan ja arkeologiaan, Itsensä kehittäminen ja oppiminen,* sekä *Sosiaalisuus ja statushyödyt*. Tutkimuksen mukaan löytötietokannan arvolupauksia tulisi olla *Ajan ja vaivan säästö, Laadukas ja runsas sisältö, Uusien kavereiden ja kontaktien hankkiminen, Toiminnan uskottavuus ja laillisuus*, sekä *Palkkiot*. Lopuksi tutkimuksesta käy ilmi, että CIS:n nykyinen hypoteesi digitaalipalveluiden arvolupauksista ja arvoajureista ei sellaisenaan sovellu kuvaamaan nettiyhteisöpalvelun arvolupauksia ja käyttäjien arvoajureita, ja että mallin täsmentäminen on tarpeellista.

Asiasanat: nettipalvelu, virtuaaliyhteisö, nettiyhteisö, CIS, arvolupaus, arvoajuri, kuluttajatietojärjestelmät, palveluinnovaatio, löytötietokanta, yhteisöpalvelu, arvonyhteisluonti, metallinetsintä

ABSTRACT

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Research of methodologies and frameworks of digitized consumer-based services is a hot topic in service and IS research communities currently. This study tests Consumer Information System framework and Critical Success Chain (CSC) methodology in the interpretive field study (n=24), which aims at eliciting requirements for find database of metal detecting hobbyists. The main research question of this study is: *What are the system value propositions and customer value drivers of the consumer-based online communities?* Following two sub-research questions were set: 1) *What are initial and ultimate value drivers of find database use? 2) What are the value propositions and feature offerings a find database system to offer to its users?* This study suggest that the find database activity is initially driven by utilitarian reasons, such as saving time and gaining work and task efficiency, to support history research and history preservation, as well as being able to interact with other hobbyists. This study also suggests that use is ultimately driven by combined utilitarian and hedonic interest, such as *history and archaeology research*, *self-esteem and learning*, and *sociality and status*. As for value propositions *time and effort savings, quality and quantity of content, new friends and contacts, credibility, experience and enjoyment* as well as *other rewards* are asked from the find database. Finally this study implicates that CIS's current hypothesis of system value propositions and customer value drivers is not directly applicable to this context and that further development of the framework is needed.

Keywords: online community, virtual community, CIS, value proposition, value driver, consumer information system, service innovation, find database, community, value co-creation, metal detecting

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1 INTRODUCTION

Service innovation and methodologies to foster innovation has gained vast attention in the academic IS and service literature during recent years. It's not surprising, as contemporary digitized services rely much on information systems. Meanwhile, the pace the firms develop new innovative services is getting ever faster; fast followers and mimics plaque the incumbent companies. Emergence of start-up boom (Ries, 2011) is one of the proofs of that. Consequently, Information Systems (IS) research discipline today acts as a principal game changer in the service innovation research.

Still, both academia and in industry have been drumming for refinement and promotion of global service research agenda (Ostrom et al., 2010, Maglio and Spohrer, 2013). Service academia (Ostrom et al., 2010) has approached the issue by defining key service research priorities; ”Identifying drivers of sustained new service success”, ”Designing emergent and planned processes for incremental and radical service innovation”, and ”Generating, prioritizing, and managing service innovation ideas”. (Ostrom et al., 2010)

One of the recent theoretical contributions in the service innovation topic is the Consumer Information Systems (CIS) research made by Tuunanen, Myers and Cassab (2010). Another methodological contribution is the research of Critical Success Chains (Peffers & Tuunanen, 2005, Peffers, Gengler, Tuunanen, 2003). Current work of CIS tends to answers to these above research priorities, especially finding *the key success factors of digitized service design,* whereas Critical Success Chain study is example of research made to answer the third question about generating, prioritizing and managing service innovation ideas.

This study along with its interpretive field study aims at contributing to further work of CIS framework and thus aim to make serial contribution to service research domain. This study capitalizes extensive literature research and Critical Success Chain (CSC) methodology to produce rich insights on digitized service system value propositions and customer value drivers. Besides, this study demonstrates Consumer Information System -based innovation work in the context of find database online community, again using Critical Success Chains (CSC) methodology. Aim is to exemplify how value propositions can be

formulated and thus to produce managerial starting point for the development of such a service.

To shed light a bit to the background of CIS work, a quick overview is done at first upon fundamental underlying notion shifts, which has preceded academic and industrial interest toward service economy.

After service economy started to revolutionize the overall economies from 1950s to millennium, the service science also started to adapt new Service-Dominant logic of marketing (Vargo & Lusch, 2004) and user-centric view on value creation. Since the industrial revolution firms were considered producing goods and through marketing creating value for themselves and their customers. Since the service revolution from the beginning of 20th century, firms started to think their behavior as providing services in a completely new logic of value creation. New service thinking emerged. According to new service-dominant logic, value was no longer provided packaged in produced goods, but were created in interaction with customers, and so value-co creation emerged. Customer-centric era started.

As a consequence of more human-cantered service era, which embraces individual experiences and emotions, changes followed in the IS domain as well; no longer were information systems developed only for improving performance outcomes, efficacy and efficiency. More emphasis was put on how to provide compelling and holistic user experience as a means of value facilitation; ”individual behavior toward new information technologies is shaped by their holistic experience with the technology techniques” (Agarwal and Karahanna, 2000). Currently ISs are more sought to capitalize human hedonic appraisal of experiences. Consequently a new research strand called User Experience (UX) emerged. It started to cope with human issues related to designing compelling information systems. UX advocates emotional and hedonic needs. It is interested in needs beyond instrumental and psychological needs which is the heart of positive experiences. (Agarwal and Karahanna, 2000, Battarbee and Forlizzi, 2004, Hassenzahl & Tractinsky, 2006, Law, Vermeeren, Hassenzahl, and Blythe, 2007, Hassenzahl, 2008) One of the preferred psychology-based concept used in service domain is the concept of Flow (coined by Csziksenmihalyi, 1991).

Flow has been taken into locus of experience work recently: Tuunanen and Govindji (2011) made a note: ”the concept of flow is suited for examining the quality of user experiences”. Not surprisingly there’s plenty of studies concerning using concept of Flow in IS design; it was studied in computer-mediated environments (Chen and Nilan, 1999, Pilke, 2004), the Flow has been tried to measure in IS context (Govindji, 2008, Tuunanen and Govindji, 2011, Takatalo and Laaksonen, 2008) and the Flow has been used in requirement prioritization (Govindji, 2008, Tuunanen and Govindji, 2011).

Furthermore, in IS research community the notion shifts of value co-creation and need for deeper interaction with customer has influenced to the way Requirement Engineering (RE) is being carried out. RE study generally aims at developing suited methods to elicit rich and meaningful features for

new service systems. In the literature RE is considered as task of bridging the gap between the user needs and the software behavior (Nuseibeh and Easterbrook, 2000). Consequently, new contemporary methodologies for RE has been suggested; by merging thoughts from best RE practices, UX thinking, as well as service-cantered logic, a Critical Success Chain method (CSC) has been suggested (Peffers & Tuunanen, 2005, Peffers, Gengler, Tuunanen, 2003). CSC combines methods such as: *a snowballing* recruitment and a *laddering interview,* to enable wide participation in design process (co-creation, co-design) and to uncover value structures related desired features.

In this service revolution continuum, recently a Consumer Information Systems (CIS), research has been initiated (Tuunanen et al., 2010). Besides it has been considered as a manifestation of development of consumer based digitized services (Tuunanen et al., 2010), it also hypothesizes the value propositions of system and customer value drivers. CIS also gives practical guides to reveal the path of designing compelling value proposition for digitized services. CIS consists of six theoretical elements, namely system value propositions and customer value drivers (or aspects and challenges of consumer IS development). Through its theoretical elements it offer rich insights on phenomena related consumer based digitized services, as well as point to the suited methodology to cope with the challenges and aspects.

Since the emergence, CIS has been in the crux of digitized service innovation research which combines best practices of IS and RE to concrete innovation work. Therefore this study adopts CIS as a study lens for this study and tend to further iterate this research line.

Yet, CIS framework has been employed in couple of papers (Govindji, 2011, Vartiainen & Tuunanen 2013, Kaaronen 2014). The results raise up a question of whether the current split of CIS's system value propositions and customer value drivers is fully balanced; some of its value proposition and customer value driver elements have constantly been under or over weighted compared to other elements in the data distribution in the field studies. This study aims at producing extensive field study to explore further how CIS's classification can be used to predict actual system value propositions and customer value drivers of online community, and to which extent they apply in such, or should they be even further modified in the context of online community web services, such as find database.

To summarize, this study aims at making contribution into above service literature firstly by *testing CIS as hypothesis of system value propositions and end-user value drivers and create rich insights on how CIS's classification could be refined to match better different kinds of web services*. This study hopefully sets a stage for further work of establishing a new digitized service research agenda. Secondly this study makes a managerial contribution to the development of the find database online community by exemplifying value proposition design using CSC methodology. The aim is at designing requirements for a novel metal detecting find database.

To further understand the context of the field study, a short overlook is taken at the metal detecting phenomena before setting the detailed research questions.

1.1 Field study context – What is metal detecting?

This paper concern exploration of consumer information system based service innovations in the metal detecting context. The study aims at designing value propositions as to metal detecting find database web service. To further understand the background of this study, now a quick outlook is taken upon the phenomena of metal detecting.

Metal detecting is a hobby of searching buried metallic objects and artefacts using a metal detector. Roger Bland stated that the metal detecting has increased public attention since these appliances became widely available in the 1970s (Bland, 2005). Suzie Thomas deemed that hobby may be rooting back to the dramatic rise of unemployment of the 1970's (in UK). Currently, based on some estimation, there are around 10,000 active hobbyists in UK (Thomas, 2012). In Finland, this phenomena has prevailed in very limited form for over 30 years. However, during since last 5 years the hobby has gained a vast visibility in the media, and therefore boomed amongst the majority of population as well. Based on estimation of forum users of Aarremaanalla.com, there are at least 500-1000 active hobbyists, and 2500-5000 individuals, who are interested in metal detecting or using metal detectors in Finland.

The metal detecting phenomena has gained attention among history and archaeology authorities, as the phenomena has reportedly influenced to a considerable increase in the amount of historical objects being found (Bland, 2005, Thomas, 2012). Only in UK, in the estimation made in 1994, 400 000 archaeologically relevant objects were being found each year (Bland, 2005). The concern is that, only a minority of all findings is being recorded. Bland (2005) shows his concern writing: "Thousands of artefacts are found every year by the public the world over, and many are sold or destroyed."

Should the authorities be alarmed of the fact that so little finds are so far recorded and some of the finds are even deemed to be sold in black markets? Actually existing study show that making money does not motivate these hobbyists; *Interest in the past* was the most popular motivation, with 54.4% of respondents claiming that this initially motivated them (Thomas, 2012). The least-popular response option was Interest in finding items of value with 7.7%. Thus, according to these findings, positive and constructive stance toward this phenomena may result positive outcomes, as many hobbyist seems to do the detecting not for material benefits. Aptly Thomas (2012) argued, that the hobby is not just the threat but have significant potential for collaboration (Thomas, 2012).

To conclude, the existing knowledge basis of the phenomena called metal detecting is yet quite sparse. Some preliminary knowledge, however, exist concerning the demographics, motivational factors and find documenting patterns

of metal detecting hobbyists. Besides the main research objective, this study contribute to this knowledge base is to define the need of establishing a finds database for the hobbyists and museum and researcher community; as a by-product, this study further sheds light on demographics of metal detecting hobby, and examine the user motivations toward finds documenting behavior. This may help better understanding of the hobbyists' motivations from the perspective of those who are dealing with them either as researchers or museum staff. This may also be of interest to some other scholars interested in this phenomena.

1.2 The main research objective and the research questions

This study aims to make a significant academic contribution to Consumer Information Systems (CIS) research;

Firstly upon the interpretive case experiment, *this study aims at testing the suitability of classification of system value propositions and customer drivers of CIS framework in the online community and find database context*. More precisely put these studies uses six elements of CIS framework as a hypothesis of system value propositions and customer value drivers of the find database and thus aim to provide positive or negative evidence towards applicability of CIS's existing elements in this context. By this, the study aims to make some generalization of the findings, which would take CIS research a step further in definition of actual universal digitized service system value propositions and customer value drivers.

This study has also a two-fold managerial targets; *firstly this study makes a managerial contribution to the development of the find database online community by exemplifying value proposition design using CSC methodology*. The aim is at designing information-rich and logically justifiable requirements for a novel metal detecting find database.

Secondly it illustrates in detail what can be the process of using information rich requirements gathering methodology in eliciting requirements for the find database service by capitalizing Snowballing for recruitment, Laddering interview for carrying out interviews, and Critical Success Chain methodology for analysing and prioritizing the best features. This information may be applicable to other similar innovation research projects.

To address the above academic research objectives, two sub-questions and one principal research question were set.

Sub-questions are as follows:

1. *What are the initial and ultimate value drivers of find database use?*

2. *What are the value propositions and feature offerings a find database system to offer to its users?*

The main research question of this study is as follows:

3. *What are the system value propositions and customer value drivers of the consumer-based online communities?*

To address the above research questions, this study examined the various knowledge bases ranging from Online Community (OC) research to Consumer Information Systems (CIS) research. To bring authentic view to the research problem and to answer the research questions, an interpretive case study upon the phenomena of metal detecting finds database was undertaken. For the data collection, a semi-structured laddering interview method with open-ended questions was used. Total of 24 hobbyists and National Board of Antiquities (NBA) professionals were recruited and interviewed. The data collection produced 478 feature-consequence-value chains, which explicate the value structures and critical personal outcomes linked to the find database system features. To analyse the data, a thematic analysis was conducted. The process resulted in eight distinct feature clusters, together with their consequences. Ultimate value structures were mapped to a socially constructed network maps. CIS framework was used to inform the pre-study preparation.

As for the research results, the study suggest that the find database activity is initially driven by following reasons: *saving time* and *gaining work and task efficiency*, to produce positive impact on *history research* and *history preservation,* and being able to *interact other hobbyists*. The database use is ultimately driven by aspirations related to: *history and archaeology research*, *self-esteem and learning*, and *sociality and status*. As for value propositions to match on those value drivers, *time and effort savings, quality and quantity of content, new friends and contacts, credibility, experience and enjoyment* as well as *other rewards* were suggested. As for delivering on those needs in terms of feature offerings, *high quality of contents of interest*, *searching functions* and *mechanism to support identifications of finds* and to *validate information* were suggested.

As with implications for research, firstly the study suggest that find database use is initially motivated by utilitarian reasons and ultimately driven by both hedonic and utilitarian drivers. Secondly this study suggest that CIS's six elements seems to be a mix-up of *success factors of digitized service development* (Context of use, Participation to the service production), *system value propositions* (Social nature of use, Construction of identities, and Service process experience) and *customer value drivers* (Goals and outcomes). This finding indicates that due to that wide diversification of elements, there's constantly certain over and under weights on certain elements in the CIS studies (e.g., Kaaronen 2014, Vartiainen & Tuunanen 2013, this study included). Therefore this study suggest that to get more balanced results in future, CIS current split should be further considered and perhaps updated. To make an initial contribution to this issue, this study also suggests a new split of system value propositions and customer drivers. It's applicable especially for *information intensive and task-oriented online community web services*. In it, customer value drivers consists of value propositions such as: *Task efficiency* (incl. Information quality and quantity), *Social na-*

ture of use (incl. Construction of identities), *Service process experience* and finally *Credible governance*, which refers to trustworthiness, credibility, legality of the service provider and the activity.

Concerning value driver side, this study suggest that CIS's current element namely *Goals and outcomes* is just a label of actual customer value drivers; thus this study suggest that *self-esteem & learning*, *subject of interest* (e.g. History research), *sociality & status*, *completionism* and *gratification* & *enjoyment* are major value drivers sub-elements of the Goals and outcomes driver element.

1.3 The structure of study

This study is structured as follows: Firstly the context of field study, namely metal detecting activity is being introduced. Then issue of designing user experiences through requirements elicitation from IS standpoint is being discussed. Then Service-Dominant logic and service logic and the terminology of value co-creation are being explored. Subsequently service science, its drawings and requirements toward Consumer Information Systems development, and finally CIS framework merging strands of thoughts from disciplines of IS and Service science, are is examined. As a final actual theory paragraph, online community (OC) literature review is being done to shed light on the phenomena to better understand existing user motivations of online community behavior as well as typical OC value propositions. As a preparation for the field study, an interpretive case study philosophy, methodology and rationale are then explored. After that the field study process is being described in detail and field study findings being reported. Finally the findings are discussed and the key research questions are answered. This study ends up to the implications given to the academics and practitioners and concluding remarks along with limitations and future research directions.

The journey will start on first elaborating the current academic understanding of how traditionally IS discipline saw the interaction between human and computer and how it has ended up to the concept of user experience (UX), and how is it proliferated in IS use situation.

Keywords: compelling information system, value co-creation, incremental innovation, user experience, online community, consumer information system (CIS), metal detecting, find database, requirement elicitation

2 Understanding user experiences

In this chapter drawing on the existing IS literature; the issue of how to create compelling information systems is being explored. First the notion of human-computer interaction stream of thought as a traditional paradigm of IS will be reviewed. Then user experience (UX) school, which emphasizes the hedonic side of information systems use, will be reviewed. UX chapter aims at answering how the subjective and experience based view on users has been put priority recently. Finally this chapter suggest how Requirements Elicitation (RE), along with different elicitation techniques can be used to understand end-user value drivers and hence to build a ground stone for great user experiences in services.

2.1 Challenges of the usability based approach

Human-Computer Interaction (HCI) is a study planning and designing of interaction between humans and computers. HCI was predominantly concerned about 'human factor', i.e. adapting technology to human nature (Hassenzahl Mark, 2008, Sánchez, Vela, Simarro, PadillaZea, 2012). Similar aspiration can be found from the fields of human factors, ergonomics, and usability engineering (Hassenzahl, 2008). Sanchez et al. (2012) define HCI as follows HCI:

> ”deals with the ways in which information technology can be designed to meet individual and organizational needs with regard to the systems’ functionality and ease of use “(Tractinsky Noam, 2004)

It was in 1980s, when the user interfaces (UI) became in first time tested and measured in terms of used time of achieving task. One of the early examples of HCI study was Card and Moran's (1980) study concerning the time of completing task using a system.

Human-Computer Interaction (HCI) discipline is criticized on attempting to enhancing usability and ease of use of information system and thus focusing

too heavily on pragmatic properties of system as well as perceptual and cognitive processes of computer user (Tractinsky, 2004, Hassenzahl & Tractinsky, 2006, Law, Roto, Hassenzahl, Vermeeren and Kort, 2009). Typically HCI study has capitalized such a models as TAM (Technology Adaptance Model), and other behavioural models. Hassenzahl & Tractinsky (Hassenzahl & Tractinsky, 2006) argue that HCI since its early days, focused almost exclusively on the achievement of behavioural goals in work settings. They claim that the task became the vocal point of usability testing, to ensure the interactive product's instrumental value for the user. HCI had its booming days in 1980s. Nevertheless, behaviouristic stance toward IS planning, design and measuring, is being aggressively contested since 1990s. The new comer is user experience (UX) school of HCI.

Since 1990s, there has been a tendency of noticing the radical limitations in the traditional usability and task oriented view of HCI. Consequently, a new User Experience (UX) school of HCI has been calling for more emotional and affective understanding of user-computer interaction. In other words, in particular, it concerns the human needs beyond instrumental and hedonic aspects of using systems idea first time represented by Don Norman (2004a) (Hassenzahl & Tractinsky, 2006, Hassenzahl, 2008) Unlike HCI, one of the main aspirations of the new UX discipline in designing information systems has been to try not to prevent frustration and dissatisfaction but rather focus on positive emotional outcomes such as joy, fun and pride (Hassenzahl & Tractinsky, 2006) and to focus on positive emotional impacts such as pleasure.

Unlike HCI, which uses behavioural models, such as Technology Adaptance Model (TAM), new UX discipline come up with applications of human psychology, such as methods that utilize flow (Csikszentmihalyi, 1991) to measure and improve the user experience.

Why this topic is so important in the scope of this study? Designing compelling IS is calling for in-depth understanding on human psychology and emotional side of what precedes consumption, and what are the factors of human experience, driving the behavior. More precisely, once knowing the psychological and emotional drivers of users, and techniques of involving them to the design, it's more likely to make appealing value propositions to the users. Furthermore, the UX as a research line can shed light on the wholeness of user experience, not just task- and work-related 'usability' issues related to it. Therefore, getting a quick overlook at currents UX research is of high interest for the scope of this study.

In sum according to the literature user experience (UX) is a human perspective (Hassenzahl & Tractinsky, 2006) in designing ISs and services. Therefore it concerns all kinds of human needs ranging from pragmatic to hedonic needs, and covering value assessment from rational to emotional (hedonic). Additional to the efficiency and usability it is interested also in needs beyond instrumental, those of non-instrumental need, all kinds of psychological needs. UX recognizes that those psychological needs can be at the heart of positive experiences with any technology. UX uses psychological constructs such as Flow

to quantify experience and improve it. Next chapter will discuss further the topic of consumer needs and motivational factors behind taking part to activity.

2.1.1 Hedonic and intrinsic factors driving current IS

A value driver is a concept often pertaining to person's own motivational factors, preferences, unsatisfied needs, or values that precedes a consumption phase. The concept is important for this study aim to first understand what the value drivers are generally, and then specifying them in certain context through case study. In this chapter firstly discussion of dyadic models of, Hedonic vs. Rational and then Intrinsic vs. Extrinsic, are discussed. Then a few studies are being introduced, which has further explored these topics.

As above indicated, the literature considers needs as *hedonic* (Law et al. 2009, Hassenzahl & Tractinsky, 2006) and *rational* (or pragmatic) (Väänänen-Vainio-Mattila et al., 2010). Tuunanen et al. (2010), in their CIS research suggest that consuming is motivated by the predicted utility of the service or good:

> ”recent study indicates consumption is motivated by predicted utility of the good and service and consumers use both rational (utilitarian) and emotional (hedonic) assessment in their consumption decisions”. (Tuunanen et al., 2010)

This suggests that the utility is being assessed using either emotional or utility-based assessment (Tuunanen et al., 2010). This idea is derived from Holbrook's (1984) study on playful consumption and Kahneman et al.'s (2003) study on hedonic nature of consumption.

A term pragmatic needs has been used to pertain to users' functional needs (which refers to utility) (Väänänen-Vainio-Mattila and Wäljas, 2009). Hassenzahl (2008) defined *pragmatic quality* as the product's perceived ability to support the achievement of "do-goals". Examples of do-goals were: making a telephone call, finding a book in an online-bookstore, and setting up a webpage. He postulated that ”pragmatic quality calls for a focus on the product its utility and usability in relation to potential tasks”. According to Väänänen-Vainio-Mattila et al. (2009) these pragmatic needs can be for example the content of service or the usability.

Tuunanen et al., 2010 argue that hedonistic needs support users’ socio-psychological and emotional aspects (refers to hedonic). As for *hedonic quality,* Hassenzahl (2008) posit that it refers to the product's perceived ability to support the achievement of "be goals". Examples of be-goals were being competent, being related to others, and being special. He put that ”hedonic quality calls for a focus on the self, i.e., the question of why does someone own and use a particular product.” and thus needs beyond the instrumental come into play. Examples of such are: a need for novelty and change, personal growth, self-expression and/or relatedness. (Hassenzahl, 2008)

Preece (2001) divides things that matter in online community usage to usability and sociability (Preece, 2001). This can be viewed as a local application of scale pragmatic/hedonic.

As for dyadic intrinsic and extrinsic view stance (term intrinsic is coined by Deci and Ryan, 1985 according to Gunce, Unverdi-Creig, Jackson, 2012), *extrinsic* is considered as a means to achieve something and intrinsic needs as doing things for its own sake (Chen et al. 2012, Camponovo, 2011, Dong Hee Shin, 2009, Unverdi-Creig and Jackson, 2012, Gutierrez, Baloian, Sergio and Zurita, 2012, Iriberri and Leroy, 2009, Tuunanen et al., 2010). Dong Hee Shin, (2009) argued that *extrinsic motivations* pertain to those of external motivational factors; i.e. when person is driven by the expectation of reward or benefit external to the system-user interaction (idea loaned from Brief, Aldag, and Russell, 1979). Such an extrinsic outcome expectations can be e.g. tangible, social, or psychological rewards, efficiency, excellence (Unverdi-Creig and Jackson, 2012), self-expression, reciprocity, external pressure, self-esteem, ego involvement, connectivity needs, human capital, career prospects and altruism (Camponovo, 2011).

Gunce et al. (2012) echoing Deci and Ryan (1985) posit that whereas intrinsic motivation requires a focus on task engagement process only, any focus on product means that *extrinsic motivation* has come into play. So any reasons to perform, other than the performing itself, must be regarded as extrinsic motivation. Consequently, according to Dong Hee Shin, (2009) Deci (1971) defined intrinsic motivation as follows: ”Intrinsic motivation refers to the performance of an activity for no reason other than the process of performing it.” Consistently Deci, Brief, Aldag and Russel (1979) (p. 497) define intrinsic motivation as: ”An intrinsically motivated user is driven by benefits derived from the interaction with the system” (Dong Hee Shin, 2009).

Agarwal and Karahanna (2000) imply as far as person is intrinsically motivated, ”the individual's interaction with the technology extends beyond mere instrumentality to be pleasurable and enjoyable as an end in itself.” Giovanni Camponovo (2011) defines intrinsic motivation as:

> ”doing something for the pleasure of doing an interesting activity or to satisfy some on psychological innate needs for competence, autonomy and relatedness” (Camponovo, 2011).

Thus the hedonic and intrinsic side of UX need to be taken to the forefront of IS development. Hedonic goals were "be goals", i.e. being competent, being related to others, and being special (Hassenzahl, 2008) and users’ socio-psychological and emotional aspects (Tuunanen et al., 2010). Intrinsically motivated person perform the action for the action itself, for the sake of the interaction with the system (Dong Hee Shin, 2009), for the pleasure and enjoyment (Agarwal and Karahanna, 2000), for the aesthetics matters, for learning and curiosity, and for play (Unverdi-Creig and Jackson, 2012), and for the competence, autonomy and relatedness (Camponovo, 2011), which all are types of intrinsic motivation, thus value driver types.

In sum current UX discipline tend to distinguish two types of goals, pragmatic (and extrinsic) and hedonic (intrinsic) ones. To leave room for hedonic value assessment, and to make use intrinsically motivating, the system must reflect to those values of the pleasure and enjoyment and aesthetics

(Tuunanen et al., 2010), as well as need for novelty and change, personal growth, self-expression and relatedness (Hassenzahl, 2008).

Next chapter describes what sort of studies is so far conducted concerning users' value drivers behind service participation and UX, and what kinds of constructs have been studied for example to design and measure user experience.

2.1.2 Motivational factors of web services - studies

Some UX studies have shown that social interaction and social related needs are key drivers behind positive experiences in web services, such as online exercising community. Ojala and Saarela (2010) studied the social needs and motivations to share data in online sport communities. Their finding was that even though the primary need of most of the end-users of sport communities was a personal training diary, perceived it advantageous to share their data with other members of the community. Through communication and sharing behavior the users wanted to get feedback, social support, new ideas, and simply to share experiences.

Malinen and Ojala (2012) studied how to design social features to support user experiences. They used interviews and *heuristics evaluation* (HE) method, to study how social features affect to emergence of positive experiences in sport and exercise communities. The social features were seen as source of inspiration, social networking and peer support. It was seen offering the opportunity to share the exercises and thus to receive recognition from others too. As for heuristic evaluation method, they suggested that HE is suitable for evaluating the social aspects of a web service and it appears to be useful in construction of a service prototype.

Väänänen-Vainio-Mattila et al., (2010) studied social UX in web services. The study resulted that both pragmatic and hedonic aspects of the system usage affect user experience and that the drivers and hindrances of social user experience (UX) were *self-expression*, *reciprocity*, *learning and curiosity.* As for hindrances, *unsuitability of content and functionality*, *incompleteness of user networks* and *lack of trust and privacy* hindered social UX. Their study underlines that especially in the web services driven by user-generated content and social interactions, the means to enhance both pragmatic and hedonic user needs were important. They defined social UX as a type of user experience ”primarily occurs as a result of social activity enabled by distinct service functionality” (Väänänen-Vainio-Mattila et al., 2010). Also they ended up suggesting a bundle of features supporting these outcomes (above features all are included in the review findings of OC paragraph).

Another stream of study is aiming at extending UX's ground toward personal psychology. Good example is the paper ”All You Need is Love: Current Strategies of Mediating Intimate Relationships through Technology”, by Hassenzahl et al., (2012), in which they use theories such as *Maslow's Theory of Personality* (Maslow 1954), *Cognitive-Experiential Self Theory* (Epstein 1990) and

Ryan and Deci's contemporary *Self-Determination Theory* (Ryan and Deci 2000) to explain "relatedness" as a theoretically rich label to create relatedness experiences in web services.

Involving User experience (UX) concept of Flow (Tuunanen and Govindji, 2011; Csziksenmihalyi, 1991) has seen offering huge possibilities to the development of compelling service experiences. Therefore it's a hot trend in UX research. Tuunanen and Govindji (2011) made a note: "the concept of flow is suited for examining the quality of user experiences". Multitude of studies already has study Flow in computer-mediated environments (Chen and Nilan, 1999, Pilke, 2004) and measuring and quantifying Flow (Govindji, 2008, Tuunanen and Govindji, 2011, Takatalo and Laaksonen, 2008) and to and involving it to requirement prioritization (Govindji, 2008, Tuunanen and Govindji, 2011). Some of these models operationalize the theory of Flow with measurable variables, such as: playfulness, enjoyment, fun, engagement, and cognitive absorption. In doing so, they aim at measuring the user experience.

However, some studies from past show, e.g. Pilke's (2004), such activities as writing, image editing, and even programming - and eventually computer games, were often mentioned as sources of flow. Chen et al. (1999) found out that task such as: information retrieval, reading and writing in newsgroups, writing e-mails and creating websites were more often causing flow than e.g. gaming. (Chen and Nilan, 1999) When considering about possible connection between hedonic tasks and flow, gaming is a traditional hedonic activity. Yet, one could argue that writing, reading, information retrieval, image edition, creating websites, and programming, might often be related to rational utility assessment. Pilke (2004), found the system independent things causing flow were: interest in things, engaging in thoughts, being on the verge of breaking through, having a proper level of skill, being able to be creative, having pressure to finishing a job, being able to accomplish, and so forth (Pilke, 2004).

This raises question, should focus rather than to question how to prioritize requirements and design good interfaces which are able to reducing cognitive load of user, to focus on question what are the use purposes the service can offer to the user to start searching information, retrieving and reading, and writing and so forth. That's a huge challenge for IS planners and service innovators.

In the next chapter a topic concerning what methods and techniques should be used support UX pursue is discussed?

2.2 User experience design

Given that designing user experience is becoming more important in IS design, a question now is, is there any way to influence to the user experience positively in planning phase? How managers should start creating positive user experiences? Marketing literature, as will be shown in the following chapters, consider UX as co-creation of experiences, and that the company and its business managers has at least partial control over the experience environment

(Prahalad and Ramaswamy, 2004) and that the experience can be influenced during interactions (Grönroos, 2008, Grönroos and Ravald, 2010). How then can supplier influence to user experience during interaction?

According to Wikipedia, developing UX in web site or in other interactive product, a plenty of methods have been used including questionnaires and focus groups to measure how well UX is being actualized in interaction situation. (http://en.wikipedia.org/wiki/User_experience). Some other studies focused on developing practical tools for designing user experiences, from which the Blueprinting method is one example (Tuunanen et al., 2010, Bitner et al. 2008). Blueprinting help designing such a task flow for service, that it enables smooth and pleasing service experience.

IS field and IS design science disciplines offers a solution to issue of UX; Pedersen and Nysveen (2009) put it like this; to focus on designing the service attributes offered to facilitate customer's value creation: ”service attributes are perceived and experienced by end-users, resulting in end-users value assessments.” (Pedersen and Nysveen, 2009) Inherent in this statement seems to be that actually to influence to the user experience, designing appealing service attributes is needed.

Subsequently, literature suggests some methods, which have been developed to design rich and meaningful requirements for new service systems. One example is the Critical Success Chain method (Peffers & Tuunanen, 2005, Peffers et al., 2003). It combines methods such as *snowballing recruitment method* and *laddering interview*. This methodology follows *Means-end theory* and *Personal construct theory* as a foundation to enable to uncovering those value drivers behind IS use, the consequences linked to them, as well as system features to fulfil it. The CSC methodology was chosen to guide the field study part of this study as well, for it is being recommended in Consumer Information System (CIS) framework. It will be further described and justified in the methodology chapter.

However, as well as the IS is constructed, it's true that once its attributes are designed, the final perception is always made by customers. According to Aarikka-Stenroos, and Jaakkola (2012), Eggert & Ulaga's (2002) put this as follows: ”value of an offering is relative to an individual customer's subjective perceptions and experiences”. Therefore also the standards an individual user use in assessing the value s/he gets out of the service matters. Understanding these standards is in the focus on enabling value for the end-users. Subsequently, designing value propositions to deliver on the needs, is challenging task, but and actually gets quite impossible without knowing what are the standards users will use when assessing value the system help creating to them.

One may conclude this paragraph as follows: To enhance user experience in use situation, it's of the importance for the service provider to facilitate suited co-design and co-production activities to design value propositions along with rich features and offerings. This study aims to experiment how to design such value propositions and service offerings, which are based on true understanding of customers, their innate emotional and psychological needs, and to foster

positive UX. In the next paragraph, IS development process, namely requirements elicitation phase and following it will be discussed.

2.3 Requirements gathering

This chapter continues on topic, which the discussion was ended in the former chapter, namely designing value propositions and rich feature offerings which to support emergence of UX. In this chapter information systems development will be discussed from the point of view of the requirements elicitation viewpoint. At beginning IS planning and IS development concepts will be elaborated. Then concept of requirements elicitation will be skimmed through. After that the meaning of strategic and wide participation of system users into the process is being discussed. Finally different requirement elicitation techniques will be discussed to prepare the further chapters.

2.3.1 Requirements elicitation

To create understanding of value creation and designing experiences in computer-mediated environments, information system requirements elicitation techniques are to be used. This is to say, creating compelling value proposition of find database web service, an underlying user needs and expectations toward the service to be first unearthed. As above UX chapter suggested, even the psychological needs and drivers need to be taken into account in that process. Therefore this study employs ISD methods and techniques to the requirements elicitation process. The following first section is written to gain a basic understanding of ISD process and its sub-phases of requirements engineering (RE), whose first phase is the requirement elicitation phase.

According to Govindji (2008), Sommerville (2007) divides system development process into five parts; (1) systems specifications (also referred as requirements engineering phase by Nuseibeh and Easterbrook, (2000)) or IS planning phase in organizational setting (Peffers, Gengler, Tuunanen, 2003), (2) design (3) implementation (4) validation and (5) evolution phases. Requirements elicitation phase is inherent to the first phase of the system development process.

Starting with requirements engineering phase, Nuseibeh & Easterbrook (2001) posit that RE is a multi-disciplinary activity of discovering stakeholders and their needs, and documenting these for further analysis as well as communication and implementation. They argue that RE deploys variety of techniques and tools in doing so. They put the goal of RE being bridging the gap between the user needs and the software behavior. As complex as RE is, it must draw on multiple disciplines, such as cognitive psychology, to understand people's needs, anthropology, which is methodology for observation of human beings, sociology, which provides understanding of political and cultural influences,

and linguistics, as RE is all about communication. (Nuseibeh and Easterbrook, 2000)

To be continued, Peffers et al. (2003) list IS planning process' four main tasks as follows: *generating ideas, evaluation, feasibility and sourcing study*, and making the *decisions*. Hickey and Davis, (2004) divide requirements process, (consistent with concept of requirements engineering and IS planning) into five sequential stages; *elicitation, analysis, triage, specification, and verification*. Both process descriptions have somewhat parallel meanings. First stage of it, elicitation, to pertain to learning, uncovering, extracting, surfacing or discovering needs of customers, users and other potential stakeholders. Second stage, namely analysis, comprise of analysing the gathered information from stakeholders to generate a list of candidate requirements by creating models of requirements, and increasing understanding and searching for incompleteness and inconsistency. (Hickey and Davis 2004) Of interest to this study is the first elicitation phase, which has been regarded as first step in the RE process (Nuseibeh & Easterbrook, 2001).

Traditional IS divides IS planning to these subsequent stages. Thus they're often called as ”waterfall” or stage-gate models. Current hot trend, agile development methods, seeks to create smaller patches of the product iteratively, not in subsequent distinct phases. Today these IS planning stages are seldom conducted linear. Rather they are done in successive passes through iterations. However, to start IS development, a baseline to be established. Requirements elicitation chapter discuss about this.

2.3.2 Requirements elicitation stages

Elicitation is defined in the literature by Nuseibeh & Easterbrook (2001) as "capturing", or as learning, uncovering, extracting, surfacing or discovering needs of customers (Hickey and Davis 2004). The notion that the elicitation is perhaps the most influential and very error-prone stage of building software system is been wide supported (Brooks, 1986, Nuseibeh and Easterbrook, 2000, Robertson, 2001, Coughlan and Macredie, 2002). Brooks (1978) argued:

> ”The hardest single part of building a software system is deciding precisely what to build (…) No other part of the work so cripples the resulting system if done wrong. No other part is more difficult to rectify later.” (Brooks, 1986)

Nuseibeh & Easterbrook (2001) list the goals of elicitation phase; to find out *what problems* need to be solved (boundaries), to *find out the stakeholders* (such as customers of system, users of systems, and developers of it), as well as *locate the objectives* the system must meet (system goals). According to them elicitation concern mostly to the *problem domain* and needs of stakeholders, rather than solutions to those problems. (Nuseibeh and Easterbrook, 2000) Consequently the interpretation, analyse, modelling and validation are out of scope of elicitation phase. Those other tasks are carried out in the superseding phases of RE

(such as analysis or evaluation, and feasibility study), which are not interest of this study scope.

According to Nuseibeh & Easterbrook (2001) many delivered systems do not meet the customers' requirements due to ineffective RE (Nuseibeh and Easterbrook, 2000) and elicitation; therefore the requirements elicitation is not just important phase of ISD, but it's also highly challenging one. One of the main challenge in RE is by the Brooks (1987) that the clients does not know what they want. They do not know what questions must be answered (Brooks, 1986). This is consistent with Nuseibeh & Easterbrook (2001), who noticed that stakeholders' goals may vary and conflict, their goals may not be explicit, or users find it difficult to articulate their requirements, and that the satisfaction of these goals may be constrained by some uncontrolled factors (Nuseibeh and Easterbrook, 2000). According to Robertson (2001) difficult is that the source of the requirements is not just one person, but also all the stakeholders, and they own view of what is important. Those are affected by their own experience, and the prejudices and views of the world. (Robertson, 2001) Also Brooks (1987) mentioned the issue of changing requirements (Brooks, 1986).

The consequences of failing in the elicitation stage are serious. Coughlan and Macredie (2002) put it as follows:

> ”Problems of understanding, particularly during the elicitation stage of the requirements process, present a major stumbling block to the success of a system because it means that ultimately the user needs will not be addressed” (Coughlan and Macredie, 2002)

So how to remedy these aforementioned challenges of inefficient requirements engineering? According to literature there's plenty of good means to overcome these mentioned difficulties. Next paragraph will further explore on the topic of IS planning from the point of view of the strategic and wide participation in IS planning.

2.3.3 Better feature through participation

For almost ten year IS planning literature has been drumming both strategic and participative (Kujala, 2003, Hartwick and Barki, 1994, McKeen and Guimaraes, 1997, Peffers and Tuunanen, 2005, Peffers et al., 2003) IS planning. For example, Peffers Gengler and Tuunanen (2003) and Peffers and Tuunanen (2005) have posed that widespread participation among the firm's employees is one of the key success factors of IS projects. They add up that the focus to be on projects that have the most potential to be important for the firm is also a key success factor in organizational IS planning. (Peffers and Tuunanen, 2005, Peffers et al., 2003) Based on Peffers et al. (2003) who refers other authors, the idea of involving wider user groups in a planning activities and hence studying the views of personnel at various levels in and around the organizations in addition to those at the executive level, is of the great necessity for IS success (Peffers et al., 2003).

The mechanism of participative IS planning has been widely studied as well. User involvement, drawing on the literature is found to be among the top IS planning success factors. According to Kujala (2003) IS plans succeed only when implemented and implementation occurs among its users. She found out that user involvement is useful thing as it has positive effects in terms of system success and user satisfaction (Kujala, 2003). So what makes involvement to be so good for success? Kujala (2003) explain this that user requirements to be more accurate when gathered by involving users. Another rationale may be that user participation may contribute to users' buy-in (Peffers et al., 2003), and toward improved levels of acceptance toward the system (Kujala, 2003). Kujala described the buy in mechanism as users increasing their competence on new technology and thus becoming more willing to take the initiatives with it (Kujala, 2003).

User involvement is not a new invention; it has been seen to have influence on users' attitude toward the system for twenty years now. Hartwick and Barki (1994) noticed correlation between these two and described the relation as follows:

> ”The more important, the more personally relevant, and the better the proposed system is perceived to be, the more likely they will desire and choose to participate in the system development process” (Hartwick and Barki, 1994).

Hartwick and Barki (1994) refer to Robey Farrow (1982), who found that one who participate will likely influence system attributes in accordance with their personal needs and desires, which in turn results in a system the one perceive as being important, personally relevant and good (Hartwick and Barki, 1994). Hartwick and Barki (1994) found out that it's the meaningful participation that has the greatest effect on involvement, attitude and use. As for voluntary information systems, such as online community information systems, an intriguing finding is the notion, that user participation and involvement are especially important for the voluntary uses of a system (Hartwick and Barki, 1994). This highlight the meaning of involvement in the systems especially designed for voluntary uses, such as find database. Yet, there's more to come.

McKeen and Guimaraes (1997) observed a strong positive relationship between the aggregate level of user participation and user satisfaction. They noticed that users are more satisfied with the projects they're actively participating with. However, involving users heavily in the low task and system complexity projects found out to be unnecessary, as involvement (itself) does not increase level of satisfaction. The thing is that the higher the complexity of system or task is, the better reason to involve users has. On the contrary to that, user participation came up to be always positively related to user satisfaction. (McKeen and Guimaraes, 1997)

Yet, it's been implicated that no participation alone can help, but nurtured with a fruitful communication; Coughlan and Macredie (2002) stress the meaning of communication and user involvement in the requirements elicitation. They advocate a more user-cantered view of system design. This viewpoint ac-

knowledges an emergent and collaborative nature of requirements; they're not easily graspable, like apples on the grass, but they rather emerge as part of ongoing interactions and negotiations between participants. Furthermore, they argue that the requirements elicitation should not be too problem solving oriented. They also posit that most failures in systems design are due to breakdown in communication. (Coughlan and Macredie, 2002)

Given there's participation and communication, there must also be a rules which guides this interaction process to unearth the requirements and to put them explicit into the paper. That's what is called elicitation method or technique. Hickey and Davis (2004) in their work define unified model for the elicitation technique choosing process. They suggest that due to constantly changing needs the requirements, the elicitation cannot be the done only sequentially in the beginning of the software development process, but iteratively and in parallel. They are consistent with Nuseibeh & Easterbrook (2001) who suggested that techniques should be used in parallel or in combination with other techniques, as one methodology may not be sufficient for all conditions (Hickey and Davis 2004). Brooks (1978) also stress the importance of iterative extraction and refinement of product requirements.

Once choosing elicitation technique is so important, how to justify the chosen methodology then? According to Hickey and Davis (2004) IS planners typically choose technique for four reasons: (1) it is the only technique that the analyst knows, (2) it's the analyst's favourite technique for all situations; (3) the analyst is following some explicit methodology, and that methodology prescribes a particular technique at the particular time; and (4) the analyst understands intuitively that the technique is effective in the current circumstances. Therefore, in order to be mature and sophisticated analyst, one must use the fourth reason in selecting the technique, instead of the first three reasons. They posit that doing so has ultimate consequences; stakeholders' needs are better understood, as well as the system being developed which satisfy those needs. (Hickey and Davis 2004)

So the implication from above chapter is that to be efficient, IS planning should offer involvement through participation and deep communication to the end-users and other potential stakeholders as early phases as possible. This is, because involvement is likely to lead to appealing features as users themselves influence by their preferences. This in turn led users having better attitude toward system and ultimately in the user satisfaction. Especially in the high-task complexity system the participation was seen helpful, as thereby users had a chance to gain competence of system usage and thus ended up having better attitude toward the system. Especially this was the case in the case of voluntary information systems uses. This is relevant to be took into account considering ways to involve people in this case study as well. Finally, as it was indicated above, not just the participation itself, but also the elicitation technique used to collect the information, has huge influence on the success of IS. Especially this is the case in what rationale was used to choose one.

In the next paragraph the requirements elicitation challenge is coped with introducing suitable methods and techniques to be used in it.

2.4 Elicitation techniques

There's multitude of methods and techniques the requirements tasks can be undertaken. Brooks for example (1987) suggest prototyping and incremental development of requirements. He uses word growing instead of building (Brooks, 1986) to better bring up the idea of incremental development of systems. Nuseibeh & Easterbrook (2001) takes a further step and divides requirement techniques to a six classes: *traditional*, *group elicitation*, *prototyping*, *model-driven*, *cognitive*, and *contextual techniques*.

To get started these prompt descriptions, traditional techniques to be described first. According to Nuseibeh & Easterbrook (2001) *traditional techniques,* group of generic techniques, include for instance the questionnaires, surveys and interviews. *Group elicitation* techniques includes for instance brainstorming and focus groups, which according to them foster stakeholder agreement and buy-in. *Prototyping* is suggested to be used in the case there's uncertainty about the requirements in a combination with other techniques. It may help to provoke discussion alongside the group elicitation technique (Nuseibeh and Easterbrook, 2000). Brooks (1987) in his novel article classic concerning silver bullets, recommend prototyping as well (Brooks, 1986). *Model-driven* offers a models to drive the elicitation for specific type of information. Techniques include techniques such as KAOS and scenario-based method CREWS. *Cognitive techniques,* originally specified for eliciting requirements for knowledge-based systems, includes for example *laddering interviews*, which uses probe questions to elicit structure and content of stakeholder knowledge. Final one, namely, *a contextual techniques* include ethnographic techniques, such as participant observation, ethnomethodology and conversation analysis. (Nuseibeh and Easterbrook, 2000)

As indicated above, multiple methods has been suggested to address the issues of RE. Choosing a method depends a lot on what kind of requirements to be elicited. Robertson (2001) suggests to distinguish requirements into three classes: *conscious requirements*, *unconscious requirements* and *undreamed requirements*. First one refers to something which stakeholder is aware of. Second one pertains to requirements which stakeholder is not aware of. Third one relates to requirements which stakeholder cannot even dream of.

Depending on the case and the stakeholders different requirements should be addressed by different techniques, which have different capacities in terms of eliciting different types of requirements. Robertson (2001) mentions a list of techniques that could be used, such as *apprenticing*, *brainstorming*, *interview* and *simulation models*, just a mention a few (Robertson, 2001). According to her, the analyst should assess the type of stakeholder groups and the type of requirements to be able to end up suited technique. For example, *apprenticing* method

is likely to uncover *unconscious requirements* because the observation will reveal requirements that nobody mentions because they are very familiar. If the analyst is looking for *undreamed requirements*, then the *brainstorming* is very good, for it enhance people to get rid of preconceived ideas and encourages them to dream. As for the *interview*, they say that it will most likely to reveal *conscious requirements*, because those are the things that are uppermost in the minds of interviewees. (Robertson, 2001)

2.5 Summary of experience design

First HCI research was introduced as school of advocating belief that information systems are mainly justified to their instrumental benefits. Then User Experience (UX) discipline was introduced as a school, which advocates understanding holistic experiences of users. Current UX discipline tend to distinguish two types of goals, pragmatic (and extrinsic) and hedonic (intrinsic) ones; to leave room for hedonic value assessment. To make use intrinsically motivating the system must reflect to those values of the pleasure and enjoyment and aesthetics (Tuunanen et al., 2010), as well as need for novelty and change, personal growth, self-expression and relatedness (Hassenzahl, 2008).

Then requirements elicitation stage was offered as a primary means to lay ground stone for later UX experiences. Subsequently, different kinds of methods and techniques were offered for the requirements elicitation stage, to uncover mechanisms, which provide these experiences. This study is interested not just conscious requirements, but also unconscious and undreamed requirements, as those are likely linked to such tacit value and goal structures highly influential to user experiences. Therefore this study employ cognitive technique called *laddering interview*, which offers great tools to go deep inside the human inner world in terms of locating those important cause – effect chains, mostly affecting to user perception of experiences. Rationale behind the decision of choosing the methodology for this study is further described in-detail in methodology chapter.

In the next chapter the Service logic of marketing will be reviewed. The chapter is important, as it gives a basic conceptual understanding of how should also information systems to proliferate value creation processes of their users.

3 Service-Dominant Logic of Marketing

The development of engaging information systems and service models is multi-disciplined and often cross-functional activity today. In this paragraph the marketing literature, more precisely the Service-Dominant logic (S-D logic) and Service logic literature is being reviewed. This chapter discusses what is the marketing literature's view on how firm creates value and experiences. Some of the key concepts which needed clarification, such as system value proposition and consumer value driver, are being clarified to illustrate a value creation cycle, and to understand the basis of the Consumer Information Systems (CIS) framework, which is used in this study as a study lens. This paragraph also discuss about the Service Science, which draws on the insights and concepts of S-D logic. Finally the CIS section will introduce the CIS development framework, which besides hypothesize system value propositions and user value drivers in digitized services, but also guides development of compelling consumer information systems with method suggestions.

First a huge shift from Goods-dominant logic (G-D logic) based on early industrial era, toward a Service-centered logic of value creation of 21th century is explored. This shift reflects a notion change of the concept of value as well; value-in-exchange changing to value-in-use. As will later illustrated, this resulted to the abandonment of producer centric way of considering value creation, and took the customer perspective of value creation to the forefront. Also the concepts of service, value propositions and value drivers, are being explored. After that the CIS model will be introduced.

3.1 Emergence of new Service-Dominant logic

Vargo et al., (2008) suggest that notion of value derives from the times of Aristotle (Aristotle 4th century B.C.). He was first one who distinguished that value emerges in use (in-use-value) and in exchange situation (in-exchange value)

(Vargo et al., 2008). Despite of that, the value was mainly considered as value-in-exchange by the beginning of 20th century (Vargo and Lusch, 2004).

During period of 1900-1950, the notion of value started evolves. However, until the 1950s, the prevalent notion of the value was more or less that the value is embedded in goods, as utility, and extracted in-exchange. In this stance, main source of value was a manufacturing goods through standardization, and then exchanging goods and the money in the market. (Vargo & Lusch, 2004)

In the so-called marketing management era of 1950s to 1980s the notion of value began to change rapidly. At that time the marketing scholars started to distinguish the services marketing from goods marketing discipline. Value was considered to be determined in marketplace. First time in history the customer, and his / her perceived usefulness, satisfaction, and product and service fulfilment, was considered as a cause for the value. (Vargo & Lusch, 2004)

One of the early assertions of value-in-use, is from Holbrook (1987) back to that era:

> ”Value is ultimately derived with the participation of, and determined by, the beneficiary (often, the customer) through use (often called ‘‘consumption’’) in the process of acquisition, usage, and disposal.” Vargo et al., 2008

According to Grönroos (Grönroos, 2008), one of his early writings from 1970s already reflect the S-D logic ideas:

> ”A service is in itself an activity (...) with in-built ability to transform the potential value (or utility) for the consumer into real value for him. (...) A service has use value (...) whereas a good (as such) has exchange value for the consumer (Grönroos, 1979, p. 86)” (Grönroos, 2008)

In above definition notable is the notion of use value and exchange value, which was one of the key differentiators between these two contestant logics; where the goods logic suggested that value is exchanged, the S-D logic contested that value is based on value perceived in use by consumer.

Furthermore, the breakthrough of S-D logic was speeding up in the 1990s, when Gummesson (1995, pp. 250-51), according Vargo & Lusch (2004), posed the necessity of revising the logic of producing goods, towards a customer perspective:

> "Customers do not buy goods or services: (T) hey buy offerings which render services which create value… The traditional division between goods and services is long out-dated. It is not a matter of redefining services and seeing them from a customer perspective; activities render services, things render services. The shift in focus to services is a shift from the means and the producer perspective to the utilization and the customer perspective.” (Vargo and Lusch, 2004)

Above Gummesson's manifestation reflects the revolutionary stance shift in marketing discipline from the firm and producer centric way of considering value creation to the customer perspective of value creation. Now it was mani-

fested that it's the value in use that matters, and that it is the customer who is the one to decide.

From 1990s till 21th century, the notion of new value creation and service-centered logic (S-D) was started to be utilized widely and finally gained its current prominence in marketing literature. Currently there's study lines of e.g. Service science (Vargo et al., 2008, Maglio and Spohrer, 2007), and Consumer Information Systems (CIS) (Tuunanen, et al., 2010) which have adapted the language and worldview from S-D logic and are advocating for the service thinking.

In summation, S-D Logic poses that instead of tangible resources, an intangible *knowledge and skills* were to be considered as resources; value was to be considered as *co-created* by firms and customers; firms were considered to only make *propositions*; goods were considered as *distribution mechanisms* for value. The above-mentioned shift to S-D logic also meant radical change in roles; no further separation of producers and consumers are to be made. (Vargo & Lusch, 2004, Vargo et al. 2008)

3.2 Supplementary view on Service-Dominant logic

Yet, even though the S-D logic drastically changed the way to understand value, there was a room for criticism toward the conceptualization of new logic. The debate between S-D logic and (Vargo, Maglio and Akaka, 2008, Vargo and Lusch, 2004) and Service-logic strand of thoughts (Grönroos, 2008, Grönroos and Ravald, 2010) started soon after the S-D logic was announced. Grönroos and Nordic School of Marketing suggested some enhancements to the conceptualization. Below the main concepts being clarified summed:

Value-supporting process: Grönroos & Ravald, 2010 stipulate that the value is created only by customer, and facilitated by firm. Grönroos define service as a *value-supporting process*. A firm by actively interacting can influence on how the value propositions are made and fulfilled through the customer's value creation (Grönroos, 2008).

Consumption: A term *consumption* is in the core of value creation in service-logic; during consumption value is created. Customers are no longer interest in what they buy and consume as such, but rather consumption is regarded as a means for value creation (Grönroos and Ravald, 2010). Furthermore, the consumption is a *self-service* process (Grönroos, 2008).

Interactions: Grönroos & Ravald (2010) argue that there's ambiguity attached to the expression value creation. So they end up suggesting that firms not just make propositions, but also actively participate in value creation through deep *interactions*.

Customer's sphere: Echoing other authors, Grönroos & Ravald (2010) argued that the value creation happens in the *customer's sphere*, instead of in the firm's sphere. Subsequently the term customers' value-generating processes

(firstly introduced by Grönroos, 2000) were suggested to be used, as an actual place for value creation.

Production and Co-production: Grönroos & Ravald (2010) suggest that the *production* refers to creating resources that facilitate value creation in the customer's sphere. (Grönroos and Ravald, 2010) Derived from here, *co-production* is producing resources in a cooperation with consumer.

Market offering & core service: As for the meaning of market offering Grönroos (2008) first suggest that the service provider's *market offering* comprise of a core service package consist of a *core service*, facilitating and supporting services. Therefore the marketing offers is no longer a static, either accepted or refused offering in its nature, but more a value-supporting process (Grönroos, 2008), which to support customer's value creation processes.

Value proposition & Value foundation: Grönroos & Ravald (2010) came up with more definitive description of *value proposition* and suggest that it's the supplier who develops the value proposition. Once accepted, customers will use the value proposition as a value foundation. According to them, consuming decision implicitly indicate that customer has accepted this value foundations as his own and by adding their own skills and the additional resources, they enter to the *value generating process*. (Grönroos and Ravald, 2010)

Value facilitation process: As for value facilitation, Grönroos (2008) suggest that putting resources (goods or services and information), customer's own skills and knowledge, and firm-based value proposition together, *the value facilitation process* results. Grönroos & Ravald (2010) suggest that value facilitation is « a prerequisite or foundation for value creation, and hereby also a reason for customers to seek a relationship with a supplier. »(Grönroos and Ravald, 2010)

As indicated above, Grönroos (2008) and Grönroos and Ravald (2010) suggested some important improvement to the S-D logic, especially needed for reduce ambiguity and obscure of concepts. Yet, the concepts are still evolving. The value circle of co-creation (Figure 1) below tends to reflect the Service Logic's notions of value co-creation. In the next chapter the Service-Dominant logic and Service logic are summarized to construct the conceptual framework of value co-creation.

3.3 Do firms create value?

According to Nordic School way of thinking by Grönroos (2008) and Grönroos and Ravald (2010), the service logic can be summarized as follows:

Firms and service providers are only value facilitators, communicators, and coordinators of interaction processes to assist customer in its value creation process. Supplier can actively contribute to the customers' experiences and value fulfilment (Grönroos and Ravald, 2010). In this stance suppliers *produce resources* together with customers. Suppliers also *establish value proposition*, and accompany *service offering* through interaction provide with the service to the customer. In this viewpoint, the interaction behaves as a facilitator, which

pushes toward parties toward value creation of customers, in their own everyday value creation processes.

As for customer's role, customers bring their own *value foundation* and adapt the firm's *value foundation* (i.e. value proposition) and start to use the *resources* to produce value for themselves. Then they add their own resources such as skills and knowledge held by them. As a consequently, the value potential of the resources emerges (Grönroos, 2008) in join value creation process. The role of customer is to create value by incorporating and integrating the resources possessed by them (Grönroos, 2008, Grönroos and Ravald, 2010) In this regard; customers are also resource integrators (Grönroos and Ravald, 2010). In Service Logic stance *Marketing* is focused on supporting value creation, through interaction.

To summarize, Service logic suggest that the value is created by customers in a service experience and consumption situation in customer's own value creation processes. Furthermore, the value is facilitated by the firm and created by the customer rather than embedded in the output. The target of the activity is the customer relationships and interactions. Yet, company and the customer can co-produce necessary resources.

Next paragraph further go in-depth to explore the concept of S-D Logic, namely, value propositions, to shed light on the ambiguity often associated to that concept and to prepare to present a framework of value proposition design.

3.4 Value foundations and value propositions

Value proposition is the very core topics of this study as this study aims at illustrating not just how to design them, but bring some new evidence what those are in find database online community services. However, this critical concept remains to be unclear in terms of its definition.

So what is the value proposition drawing on the literature? Are there any possibilities to create all catching definition for it?

S-D logic above indicated that value propositions are considered something intermediary to the value co-creation processes, something to be either accepted, rejected, or unnoticed (Vargo et al., 2008). S-D literature suggest that they're created in relationships that involve customers in developing, customizing them to be competitively compelling, and that the firm can only suggest them, and trying to strive to get distinguished from those of competitors. In S-D logic value propositions, are something that are validated in the marketplace (Vargo and Lusch, 2004).

As for defining value proposition definition Maglio and Spohrer (2013), point to Anderson, Kumar, & Narus, (2007), and put that in routine business interactions, the value propositions are described as ”a specific outcomes and key performance indicators that will change as a result of accepting an offer” (Maglio & Spohrer, 2013).

Service logic suggests that customers bring their own value foundation and adapt the firm's value foundation. Additionally firms are not just creating value propositions, but they can actively influence how they're are made and fulfilled through the customer value creation (Grönroos, 2008). Service logic pose that value propositions are suggestions and projections of what impact the customers can expect, being at the same time a promise about potential future value creation and the value propositions are used as a value foundation in value creation process; to consume, customer must accept this value foundation as his own (Grönroos and Ravald, 2010; Grönroos 2006)

Other more practical definitions of value propositions follows: Tuunanen et al. (2010) defines value propositions as something the service system offers, which in turn appeal to customer who start to use the system. Vartiainen and Tuunanen (2013) defines value proposition as features that enable value co-creation. The latter definition differs slightly from other definitions as it pertains service system offering.

Remarkably, the relation of a term offering and value proposition is not fully clarified. Both offering and value proposition are define being produced in conjunction with customer in a customization process, and both are there to appeal customer to start to use service. Nevertheless, service logic (Grönroos, 2008, Grönroos and Ravald, 2010) separates concept of market offering from value foundation. Unlike value proposition, offering is the set of concrete offerings (such as features) the firm creates to enter to market, whereas value proposition is a predicted value caused by using those features. Additionally value proposition is considered as value-supporting process upon interaction with customers, not just a static proposition.

Furthermore Pedersen and Nysven (2009) define value proposition something which is designable; they also link value proposition to offering posing: "a main problem is how to design business models with value propositions that maximize the customer value of the offering..." This brings the view on the topic of designing value propositions and *value proposition design*. The literature show that there's specific effort, namely within the service science, which aims at designing value propositions. Maglio and Spohrer (2013), the pioneers of service science discipline, propose as follows:

> "value proposition design is a systematic search process that providers can perform to improve existing offerings, create new offerings, and reconfigure their ecosystems, for instance, through acquisitions, divestitures, and partnering".

These outcomes (improve existing offerings, create new offerings, or reconfigure the ecosystem), they call as adaptive advantages. They suggest that value-proposition design is actually business model innovation (Maglio & Spohrer, 2013).

To summarize, one may put that number of attempts emerges to define a concept of value proposition. All views are not fully aligned. However, based on the recent study of Service logic and service science, the definition of value proposition and interrelation between the term offering and value proposition

is getting more clarified. In this study, the concept of value proposition is used to pertain to the:

> Suggestions and projections of specific outcomes and impacts the customers can expect, as a result of accepting offer.

The value propositions are kind of a promise about potential future value creation, upon accepting the offer. This definition is consistent with service logic (Grönroos and Ravald, 2010) and service science thinking (Maglio & Spohrer, 2013). This section attempted to answer to a question, what actually is the value proposition.

In next chapter the main concepts of value co-creation are gathered in one picture, which illustrates the value co-creation cycle (Figure 1).

3.5 Value co-creation and other key concepts summarized

In this chapter the value co-creation concepts are summarized and the circle of value co-creation is represented.

Service logic acknowledges the consumer as independent core entity in value creation (below Figure 1, right grey column). Consumer has value drivers, covering all fundament needs, goals, and values driving toward consumption decisions. Through interaction and accepting offers from service provider, consumer can render the value creation.

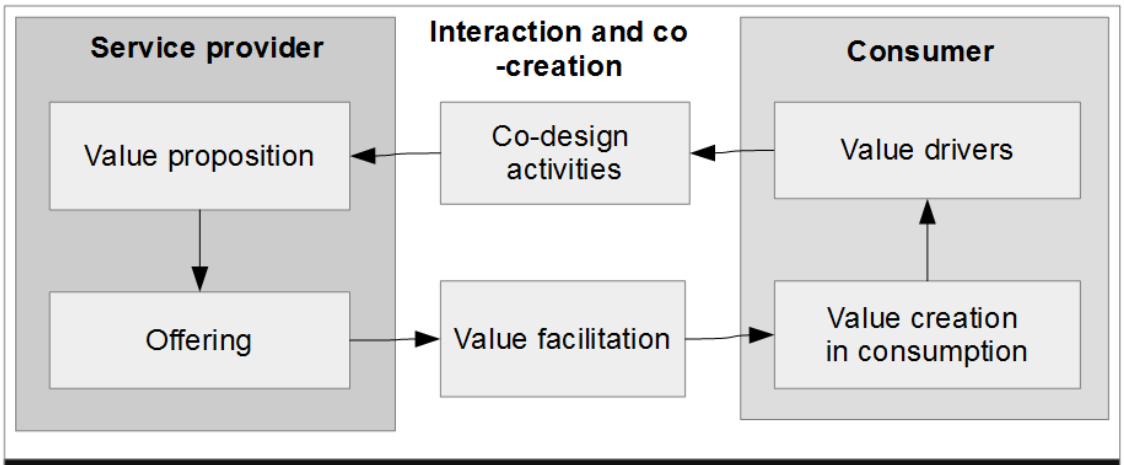


Figure 1 - Circle of value creation

The interaction is seen a core determinant of value creation in the service literature (Vargo and Lusch, 2004, Grönroos, 2008, Grönroos and Ravald, 2010, Maglio & Spohrer, 2013). "At a minimum, a provider entity and a customer en-

tity must interact, either directly or indirectly, to cocreate value." Maglio and Spohrer (2013)

The middle white column (Figure 1) illustrates the interaction; upper part of it illustrates designing activities, such as value proposition designing, which in IS context pertain to e.g. requirements elicitation. In the next part, design activities such as product and service development aims at designing appealing value propositions and related service offerings. Left column constitutes the service provider's sphere, in which emerges. In that sphere service provider tend to either improve existing offerings, or to create new offerings.

Given that there's established offerings, combined from service provider's resources, which the firm creates to enter to market, it's going to be put to the test in value facilitation process. Marketing literature would use word marketing to pertain to this phase. Some would label that stage as customer development. Once offering is put to the market, the first round of incremental service development ends up when customer accepts offer. Thus value creation happens in consumer's own sphere.

Circle of value co-creation (Figure 1) tends to illustrate how the value co-creation employs the consumer and the service provider. It stems from consumer's value drivers, goes through co-design activities towards value proposition and offering, and then come back through marketing and consumption to the benefit of the consumer. To be successful in the value co-creation, further rounds to be done. Re-evaluating of the customer needs, assessing the related value propositions and offerings, adjusting the facilitation and fine-tuning the experience to be taken into place.

In the further chapters Service Science and Consumer Information Systems are further discussed to understand how this value co-creation process should be addressed in the level of practical methodology and tools.

3.6 Current service science and research

In the former chapter the value creation was discussed. In this paragraph a quick overlook is taken at the topic of service science research "a scientific attention on problems associated with innovating service and enhancing service provision" (Vargo et al., 2008). Service science suggests that value and value creation are at the heart of services. Furthermore, this chapter will take a look at service science definitions and its current trends. Finally this chapter motivates this study, from the suggested service science priority research topic viewpoint.

An increasing emphasis in the service science (Maglio & Spohrer, 2013) and IS development disciplines (Tuunanen et al., 2010) is put on how to design sustainable business models, value propositions and system offerings, which capitalize the value creation processes embedded in the customer experience.

Pedersen and Nysven (2009) found out that designing value proposition presentations for new services is difficult. They noticed that those value propositions do not always result in the intended end-user service attribute percep-

tions. Therefore they raised a critical question ”How to design business models with value propositions that maximize the customer value of the offering” (Pedersen and Nysveen, 2009). This is the question of service science is aiming at answering to.

Service science stem from the ground of Service-Dominant logic of marketing. According to Maglio and Spohrer (2013), the service science has adapted a perspective, language and worldview from S-D logic (Maglio & Spohrer, 2013). In service science, value co-creation is seen as a core matter of the service. Spohrer, Giuiusa, Demirkan and Ing (2013) argued that service is actually a value co-creation.

Primarily Stephen Vargo, Jim Spohrer and Paul P. Maglio, of whom two latter are IBMers, have popularized Service science. Thanks to them, service science has evolved much since the first mentioning almost a decade ago.

Over the course of these years, some interesting papers has been produced as for concepts of service systems abstraction (Spohrer, Vargo, Caswell, Maglio, (2008), Maglio & Spohrer, 2008), service systems integrations, normative service science, and service SSME (service science, management, and engineering) (Spohrer et al., 2008), and service science principles, business model innovation, and value proposition design (Maglio & Spohrer, 2013).

Before defining service science, it's reasonable to define *service and service system first*: Service definitions vary in the literature. One of the early definition is: “A service is a time-perishable, intangible experience performed for a customer acting in the role of a co-producer.” (Oliveira and von Hippel, 2010). Vargo, Maglio and Akaka (2008), refers to Vargo and Lusch (2004, 2006), who define service promptly as follows: ”Service is the application of competences (knowledge and skills) by one entity for the benefit of another”. Vargo et al. (2008) suggest that service system, can be any entities that can take actions, apply resources, and work with others in mutually beneficial ways, are service systems, so even individuals, groups, organizations, governments and firms can be service systems. They define service system as ”an arrangement of resources (including people, technology, information, etc.)” (Vargo et al., 2008).

Spohrer, Vargo, Caswell and Maglio (2008) define a *service system* rather similarly as Vargo et al. (2008) as follows: ”the service system, which is a configuration of people, technologies, and other resources that interact with other service systems to create mutual value” (Spohrer et al., 2008). They later on added to this definition additionally thing, namely a value propositions, which together connects internal and external service systems, and shared information (Maglio & Spohrer, 2008).

As for *service science* definitions, one of the oldest definitions of service science derives back to 2006. Chesbrough and Spohrer, (2006), and Spohrer et al. (2006), posited that service science ”aims to focus scientific attention on problems associated with innovating service and enhancing service provision.” (Vargo et al., 2008). Spohrer et al. (2007, 2008) defined service science as: ”the study of service systems and of the co-creation of value within complex constellations of integrated resources” (Vargo et al., 2008). Vargo et al. (2008) posed

that the service science "centers on the participants, processes, and resources that interact to create value in service systems."

Maglio and Spohrer (2007) define service science as "the study of service systems, aiming to create a basis for systematic service innovation" (Maglio & Spohrer, 2008). Later on Spohrer et al. (2008) defined service science as "the study of the application of the resources of one or more systems for the benefit of another system in economic exchange."

The most recent contributions of service science definitions come from Maglio and Spohrer (2013). They divided service science definition into four principles: First principle clarifies the entities of service, namely: *people, technologies, organizations, and information. T*he second principle adjust the meaning of *resources* are in terms of *reconfiguration* mutually agreed to *value propositions.* The third principle, describe further the meaning of other *stakeholder groups* in service system. The fourth principle defining *the coordination actions*, which emerge through symbolic processes of valuing and communication.

Definitive to this line of work (based on these two IBMers) is that it continues seeing the service in a highly systematic way. This view differs slightly from a pluralistic view represented by the Ostrom et al. (2010), which calls for further extending the view of seeing service science. This pluralistic view defines service science as:

> "emerging interdisciplinary field of inquiry that focuses on fundamental science, models, theories, and applications to drive service innovation, competition, and well-being through cocreation of value." (Ostrom et al., 2010).

Thus literature seems to consider a service as a perspective of value creation and as an application or arrangement of resources activated in interaction, which create and captures value. With regards to service science, common view to all current service science literature strands is to see service science dealing with driving a systematic services development and innovating new services. Whereas a traditional service science strive on systematic service science developing concepts of service systems, resources, processes and entities, the new kind of "pluralistic" stream of study has been advocated by Ostrom et al., (2010).

As CIS is specifically concerned about consumer-based web services, adapting to Ostrom et al., (2010) the following question is relevant for CIS research: *What are the drivers of sustained new digitized service success?*

Given that value co-creation and service science terminology was explored, a further look at the theoretical framework and study lens of this study, namely CIS (Tuunanen et al., 2010) is taken in the next chapter.

3.7 Co-creation of value in Consumer Information System

Designing value propositions and suited feature offerings that support emergence of holistic user experience has been hot topic in IS discipline for recent years. Consumer Information Systems (CIS) development framework by Tuunanen et al., (2010) is one recent contributions in the field. It combines concepts and insights from IS, S-D Logic as well as service science and also suggest set of system value propositions and and-user value drivers. It also offers a methodological guide for exploring them. One of the main motivations behind exploitation of CIS is the awareness of hedonic nature of value assessment, which was discussed in User Experience paragraph. Tuunanen et al., (2010) argue that the reappraisal of information systems development methods is needed, and customers has to take aboard in co-creation process in designing phase. CIS give offers insights how to do so.

By its definition (Tuunanen et al., 2010) Consumer Information Systems (CIS) are:

> ”Systems that enable consumer value co-creation through the development and implementation of information technology enabled processes that integrate system value propositions with customer value drivers.”

As definition explicates, the value co-creation refers in this context to the development and implementation of such a processes, which integrates system value propositions with customer value drivers. Therefore co-creation in here refers to joint efforts of firm and customer to design, develop and implementation of such a system value propositions and feature offerings, which facilitate the value co-creation processes of end-user.

3.7.1 Elements of system value propositions and value drivers

CIS consist of six aspects and challenges (considered also as value propositions and drivers) of developing consumer information systems. Each aspect offers a theoretically rich insights and thus enable grounding for development of rich features, which support hedonic value assessment.

CIS framework includes three aspects of what designer should consider: *social nature of use*, *construction of identities*, *and context of use*. The framework also includes three challenges to pay attention on: *service process experience*, *customer participation in service production*, and *customer goals and outcomes*. Each aspect and challenge has been justified by referring to relative intellectual foundation from the literature from different fields.

As for including each aspect into development process and to overcome the mentioned challenges, the framework suggests theoretical approaches, methods and techniques that suit well to that purposes. Those methods help designer to cope with the designing challenges related to each of the angles.

The first aspect and value proposition, consumer requirement and value proposition, namely *social nature of use*, refers to need of understanding consumer as a social actor, understand what motivates consumer as a social human being toward consumption. The authors motivate this pointing to Social Actor Theory (coined by Lamb and Kling, 2003): ”Consumers rarely use any information system in isolation” (Tuunanen et al., 2010). Vartiainen and Tuunanen (2013) explicate this further posing that “actor” should be used instead of term “user”. What, then is the CIS's suggestion to include this viewpoint to the IS planning? CIS suggest laddering approach to taking this aspect into account in design. Laddering is further examined in the methodology section.

The second aspect and value proposition, namely *construction of identities* is justified by Social Actor Theory and Social Construction of Identity theory (Tuunanen et al., 2010). Tuunanen et al. (2010) argue that: ”consumers are likely to relate to the services they use and they may create and/or alter their identities in real and virtual lives”. As a theoretical approach to consider this in designing, Tuunanen et al., (2010) suggest to use Critical Success Chain (SCS) method to for analysing and prioritizing those features, consequences and values that are strictly related to construction of social identities. SCS is further described in the methodology section.

The third aspect and value proposition, namely *context of use,* refer to the notions that anticipated system usage and realized system usage are not always matching. Therefore, Tuunanen et al. (2010) suggest that it's good to enable system to be used in a multiple purposes. Moreover, Vartiainen and Tuunanen (2013) refer to other authors and pose that the context of use is likely to influence to the service experience of users. They also posit that cultural context is likely to influence user requirements, as well as system use (Vartiainen and Tuunanen, 2013). This seems to be relevant point, especially in IS planning stage. This aspect suggest that CISs to be developed involving geographically dispersed users, and different cultural, contextual, situational and regional aspects to be taken into account in the planning. The framework suggests laddering technique to be used to cover different context of potential users. Laddering technique is described in-detail in the methodology chapter.

Concerning the challenges also considered as value driver, the first one, namely *service process experience,* is justified by literature suggesting the user experience design's importance in IS development. Authors posit that consumers now expect more personalized experiences. Theory foundation for this element consist for example theory of cognitive absorption (Tuunanen et al., 2010). Referring to Agarwal and Karahanna (2000), Tuunanen et al. (2010) argue that experience of flow is important. They posit that Holbrook et al. (1984) has initiated a term of “playful consumption,” which means that play becomes part of the consumption experience. They also refer to Kahneman et al. (2003) who has suggested that consumers derive not only utility from consumption, but also a benefits of a hedonic nature (Vartiainen and Tuunanen, 2013). As a solution to involve user experience viewpoint to the planning of IS, the framework suggest Flow method to be used for the development of interactive services (Tuunanen

et al., 2010). This is to support the customers to experience pleasure and enjoyment derived from CIS use. As this study focuses on requirement elicitation phase, the flow method is not used.

The second challenge and value driver mentioned by Tuunanen et al. (2010) is the *customer participation in service production*. As it was discussed in the IS planning chapter, researchers have long promoted participation of users in IS development. Yet, Vartiainen and Tuunanen (2013) admit that there is still some uncertainty about the best ways involves customers. However, this element is consisted of rich theoretical foundation. The RE literature shows that customer involvement and participation positively effects on user satisfaction (Kujala, 2003, Hartwick and Barki (1994), McKeen and Guimaraes (1997). Tuunanen et al. (2010) also pertain to service system co-production literature (Tuunanen et al., 2010; Karlsen, 2008), and lead user engagement (Tuunanen et al., 2010; Hippel, 1986, von Hippel 2001, von Hippel & Katz, 2002) (Vartiainen and Tuunanen, 2013). Hence, CIS framework encourage to using lead users method and snowballing sampling method for the recruitment of participants in service design. This element also suggests a laddering interviewing technique to be used in here. Tuunanen et al. (2010) Lead user and snowballing techniques are further described in the methodology section.

The final challenge and value driver mentioned by Tuunanen et al. (2010) is *customer goals and outcomes*. This CIS's element refers to difficulty to completely understand those contextual, cultural and regional specific values, goals, motivations, and needs, which functions as antecedent in service usage. They refer to Holbrook et al. (1984), and Kahneman et al. (2003) who has made novel research of hedonic utility, and research on consumer trade-offs (Green and Srinivasan, 1990, Ostrom and Iacobucci, 1995). (Tuunanen et al. 2010) They also point out the flaws of TAM theory. Subsequently CIS model suggest that in different cultural regions there may be different preferences for each service features. As a solution to this difficulty, CIS framework suggest so called quality function deployment techniques to ensure that product or service features are linked to customer needs (Tuunanen et al., 2010, Vartiainen and Tuunanen, 2013). Additionally the framework suggests to find another ways to analyse requirements data to find those relevant value drivers, and to reveal cultural differences (Tuunanen et al., 2010). Quality function deployment techniques are not further described in this study. Instead, a method of collecting ranking information as to features of the importance is being used to find those features of most importance to the customers in this study.

3.7.2 Summary of Consumer Information System Framework

As represented in below picture (Figure 2), CIS highlights the main six themes derived from the background theories (placed in the left and in the right in the above figure). These six elements are often used as suggestion of end-user value drivers and system value proposition. As was already suggested, this study continues on testing how well these above CIS's six elements behave as

value propositions and value drivers compared to those actual value drivers and propositions of this specific context, which are produced by using CSC methodology. The question; should these be used just as aspects and challenges or as a hypothesis of actual value drivers and propositions is being answered in the implications chapter.

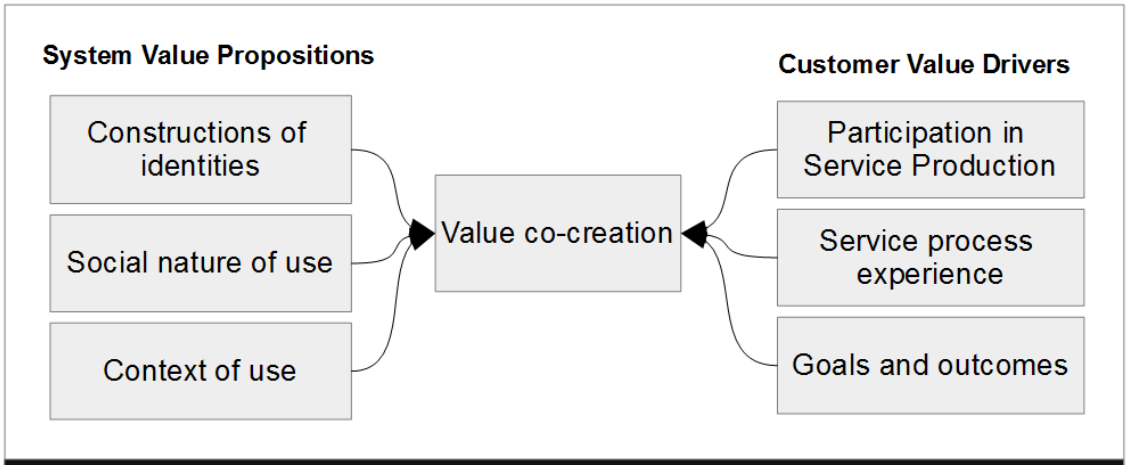


Figure 2 - Consumer Information Systems (CIS) value co-creation framework

To summarize, Tuunanen et al., (2010) proposed Consumer Information Systems framework for the development of digitized services development. CIS suggest three system value propositions and three customer value drivers, which were mentioned above.

As for stages of co-creation illustrated (Figure 1), CIS framework suggest theories and methodologies to cope aspects and challenges each stages; CIS's suggested techniques help in requirement elicitation (snowballing, laddering), analysing features and prioritizing them (CSC). It also suggests Flow and quality function deployment techniques. How each CIS's elements are relative to each stage of value co-creation process, further explanation is made in chapter 8.8.

Nevertheless, as authors admit, CIS framework does not cover all aspects of value co-creation in CIS. Due to that, this study aims at bringing some new evidence what are those actual value drivers and value propositions in find database online community context. This study also aims at building actual representation of real consumer value drivers and system value propositions in online community context.

To make good contribution the primary objective of this study, an online community literature review is being undertaken in the next paragraph. This is to gain a basic understanding of the system value propositions and user value drivers often associated to online community success.

4 Online communities – social experiences

Online communities and community-like web services are examples of services emerged in the internet era. Everyone knows at least some of these examples as to blogging sites such as: Blogster (http://www.blogster.com/), art sharing sites as: Devian Art (http://www.deviantart.com/), or image hosting and sharing sites, such as: FlicR (https://www.flickr.com/), and Instagram (http://instagram.com/). These services are showing how the experiences are facilitated in cyberspace nowadays. Even the old fashioned looking discussion forums, such as: Mac Rumors (http://www.macrumors.com/), Warrior Forum (http://www.warriorforum.com/), DigitalPoint (https://www.digitalpoint.com/), Web Hosting Talk (http://www.webhostingtalk.com/) and Mine Craft Forum (http://www.minecraftforum.net/), keep attracting great amounts of users every day. Why?

In this paragraph an online community literature review is conducted to offer inspirational starting point for understanding value propositions offered and strategies used in online communities. The literature review was conducted using Nelli searching tool (http://www.nelliportaali.fi/). Keywords used were as follows: online community, virtual community, trust, knowledge sharing, user experience, e-community, web 2.0, pervasive IT, Social Cognitive Theory (SCT) and knowledge sharing. The words were used in different combinations. Also Google Scholar (http://scholar.google.fi/) was used by following search terms: online community, virtual community, social cognitive theory, motivation, self-efficacy, intrinsic, extrinsic, and user experience.

The findings of this chapter are being used two ways: firstly a suggestion of value creation elements, namely system value propositions and customer value drivers in online community context is being illustrated. Secondly, the results will be accompanied to the field study results and finally compared to actual elements of CIS framework.

4.1 Definitions of online and virtual community

In this chapter online community is defined. Due to catching all definition of online community remains not to exist, this chapter tries to improve from that by suggesting one. The chapter begins with exploring existing descriptions and then proceeds to suggesting one, which reflects main ideas of the rest.

Online communities derive back to the dawn of computer networks. People have been interacting by utilizing connected computers ever since the first enabling computer programs were made available. However, for a longer time interaction was merely a secondary purpose derived from using computers. Recently an increasing number of online community web services are built on the basis of social activity, such as knowledge sharing communities, communities of practices (Cops), virtual learning communities, online sports exercising and training communities, discussion forums and interest communities, media sharing communities, social networking services, blogging and writing communities, and gaming virtual worlds.

Meanwhile the concept of online community is evolved by the time from 1990s to 21st century. It derives back to the concept of virtual community; however the term was updated in the beginning of 21st century. Based on Spagnoletti and Resca (2012), the virtual community concept was abandoned in 2000, when a new concept of online community was taken in use.

The literature review (Camponovo, 2011, Spagnoletti and Resca, 2012, Preece, 2001, Ellis et al., 2004) brings up a multiple definitions to concept of virtual / online community. Ellis, R. Oldridge and A. Vasconcelos suggest that the concept of Virtual Community was firstly defined by Rheingold (1994) as follows:

> "(…) cultural aggregations that emerge when enough people bump into each other often enough in cyberspace. A virtual community is a group of people who may or may not meet one another face-to-face, and who exchange words and ideas through the mediation of computer bulletin boards and networks. (Rheingold 1994: 57-58)" (Ellis et al., 2004)

Rheingold uses also a shorter definition of virtual community, which is:

> "social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace. Rheingold (1994, p. 5)" (Ellis et al., 2004)

According to Ellis et al. (2004) Rheingold traces the social origins of virtual community back to the development of the Whole Earth 'Lectronic Link (WELL) (Rheingold, 1993, 1994). Ellis et al. (2004) introduce another definition of virtual community, which is:

> "(virtual communities)...are ubiquitous and part of our everyday lives. Their existence goes beyond the boundaries of organizations; they can be geographically dis-

> persed and, in some cases, take the shape of a virtual community (Davenport, 2001; Kimble et al., 2001)" (Ellis et al., 2004)

Jenny Preece (2001), one of the 21st century's seminal online community scholars defined online community as follows:

> "any virtual social space where people come together to get and give information or support, to learn or to find company." (Preece, 2001)

More recently, Preece and Maloney-Krichmar (2003) defined online community using five points: 1) members have a shared goal, interest, need, or activity that provides the primary reason for belonging to the community, 2) members engage in repeated, active participation and there are often intense interactions, strong emotional ties and shared activities occurring between participants, 3) members have access to shared resources and there are policies for determining access to those resources, 4) reciprocity of information, support and services between members is important, 5) there is a shared context of social conventions, language, and protocols. (Preece and Maloney-Krichmar, 2003)

Drawing on aforementioned definitions, the below characteristic seems definitive to online communities:

- OCs involves geographically dispersed people, who are getting into a reciprocal participation, interaction and social exchange. Involves shared context of social conventions and language and protocols. There are also resources and policies to determining access to the resources.
- OCs emerges in cyberspaces, is ubiquitous and goes beyond organization boundaries. Networks and computers functions as a mediator and facilitator to the activity.
- OCs participation primarily motivated upon shared goal, interest, need, finding company, or feeling belonginess, to get and to give information, to get and give support, to learn things and to find company.

To sum this chapter, online community concept is something that is evolved since 1990s and is still evolving. There's, yet, certain consistency in the definitions of virtual and online communities. The concept mainly refer to the certain socially aggregated phenomena, which takes place in the cyber space by the geographically dispersed people, and which is driven by the shared goals, interests and needs.

Noteworthy is that the line between online communities, and web services, such as networking services is quite elusive.

4.2 Types of online communities

Upon this review different kinds of studied online communities types were identified. This study found two types of online communities, namely *Organizational* and *non-organizational* OCs.

Organizational online communities:

- Knowledge sharing communities (Chen, Chang and Liu, 2012, Chennamaneni, 2006, Tsai and Cheng, 2012),
- Communities of practices (Cops) (Preece, 2004, Sharratt and Usoro, 2003, Hernandes and Fresneda, 2003, I-Chun Tsai, 2012),
- Virtual learning communities (Chen, Chen, and Kinshuk, 2009), and
- Workplace virtual worlds (Shalini, Shirish and Yin-Leng, 2012).

Non-organizational communities:

- Online sports exercising and training communities (Malinen and Ojala, 2012, Ojala and Saarela, 2010, Chou, 2010),
- Discussion forums and interest communities (Cheng and Liu 2012, Zhou, 2011, Tsai and Pai, 2010, Sangwan, 2005, Chou, 2010),
- Media sharing (photo, music and news) communities (Montola, Nummenmaa, Lucero, Boberg, and Korhonen, 2009, Dongwon, Jaimie, Junha, Jaejeung, Junghoon, 2010), Long, Chei and Dion, 2011),
- Social networking services (Väänänen-Vainio-Mattila, and Wäljas, 2009, Väänänen-Vainio-Mattila, et al., 2010, Dongwon L., Jaimie, Junha, Jaejeung and Junghoon, 2010, Shipps and Phillips, 2013),
- Blogging and writing communities (Lu and Hsiao, 2007, Wang, Chih and Jhong, 2009, Lampe, Wash, Velasquez and Ozkaya, 2010),
- Societal citizenship communities (Preece and Shneiderman, 2009, Bo, Dahui, and Bingjia 2012, Wang and French, 2008), and
- Gaming virtual worlds (Dong Hee Shin, 2009, Lin Chieh-Peng, 2010).

The above split does not follow any validated classification or typology of online communities. It, however, can give some idea of what types of services are in literature considered as online communities.

In the next paragraph a theoretical construct namely Uses & Gratifications theory is being introduced. It has ability to offer a rich insights of what motivates people using mass media and social web services. It also creates a good conceptual scheme for classification of human psychological needs and goals driving in a coherent and meaningful manner.

4.3 Uses & Gratifications theory of media consumption

Upon literature review, this study uses Uses and Gratifications theory to classify value driver elements of online community users. Based on the literature findings, *Uses and Gratifications Theory* - U&G (invented by Katz and Gurevitch, 1973, 1974) is very definitive in terms of how it describes motivations toward online community usage too. According to Sangwan U&G is a theory derived from communication research paradigm of social sciences, and is widely used theory in research on advertising and mass media communication (Sangwan, 2005). According to Lampe et al., (2010) U&G tells what motivates individual users to consume media. It proposes a five-part classification of human motivation. The parts are cognitive, affective, personal integrative, social integrative and tension release needs.

U&G theory suggests five needs, behind consumption of media;

- The cognitive needs ”represent the intrinsic desire for information acquisition for knowledge and understanding in an increasingly information rich society” (Sangwan, 2005)

- The affective needs is defined as follows: ”related to emotional experiences, and intrinsic desire for pleasure, entertainment and aesthetics” (Sangwan, 2005)

- The personal integrative needs is defined as ”derive from individual’s desire to appear credible, be perceived as confident, and have high self-esteem.” (Sangwan, 2005)

- The social integrative needs, is defined as: ”affiliation needs where audience want to be part of a group, and want to be recognized as part of the group and relate to sense of belonging.” (Sangwan, 2005)

- The tension release needs pertain to the ”need for escape and diversion from problems and routines.” (Sangwan, 2005)

Provided that the latter conceptual classification of user drivers seems to bond the findings of the review of this chapter together nicely, it will form a basement for a OC value co-creation illustration (see below Table 1).

Table 1 – Value drivers adapted to Uses & Gratifications' classification

Class of consumer need	Value driver subtype	No of papers	Class of consumer need	Value driver subtype	No of papers
Affective needs	Satisfaction	5	**Social integrative needs**	Social interaction	17
	Enjoyment	4		Recognition	12
	Entertainment	3		Sociability	12
	Pleasure	1		Reputation	9
	Aestethics	1		Reciprocity	8
	Affection	1		Communication needs	7
Personal integrative needs	identification	9		Social status	5
	Commitment and loyalty	8		Interpersonal and social relationships	5
	Joy of success	1		Social identity	4
	Achievements	5		Making friends	3
	Altruism	5		Competition	2
	Need for control	4		Challenging others	2
	Self-expression	4		Helping others	1
	Self-esteem	3		Approval	1
	Feel of competence	3		Inclusion	1
	Ffeel of power	3		Relatedness	1
	Feel of obligation	3		Collaboration	1
	Credibility	2	**Tension release needs**	Process experience	7
	Self-disclosure	2		Relax	3
	Autonomy	2		Escapism	2
	Feel of worthy	1		Immersion	1
	Challenging oneself	1	**Cognitive needs**	Getting support	11
	Domination	1		Learning and curiosity	6
	Completionism	1		Getting guidance	3
	Progress	1		Discovery & exploration	2
	Pride about accomplishments	1		Getting feedback	1
	Provocation	1			

4.4 Value drivers behind online community use

Drawing on the OC literature review, plenty of needs and goals considered driving OC use were identified. The below table (Table 3) depicts these value drivers classified upon Uses & Gratifications theory classes (Sangwan, 2005).

Table 3 – GOOD GOVERNMENT related value propositions and offerings				
Value propositions	**Sub types of value propositions**	**No of papers**	**Offerings**	**No of papers**
	Trust	22	Purpose statement	11
	Commitment	11	Offline events and activities	7
	Policy / policies	10	Trust enhancement tools	3
	Involvement	8	Support and moderation	3
	Membership	6	Habit creation	3
	Competence	6	Rules and guidelines	2
	Governance	4	Rituals	2
	Benevolence	4	Etiquette	2
	Empathy	4	Welcoming messages	1
Good government	Welcoming athmosphere	3	Role models	1
	Alleviating fear (e.g. losing power and face)	3	Planting conversations	1
	Receptivity & receptiveness	2	Participation of experts	1
	Honesty	2	Granting sufficient resources	1
	Integrity based trust	1	Examples	1
	Transparency	1	Behavioral modeling	1
	Justice	1	A few clear regulations	1
	Pro-sharing norms	1	Verbal persuasion	1
	Control	1		
	Evolution of standards	1		
	Mentoring	1		

The first value driver type is a *cognitive needs* consisting of value drivers related to cognitive processes. Cognitive needs driving OC use were: getting guidance and support, learning and curiosity, and discovering and exploring new things.

The theme *affective needs,* includes all intrinsic needs that relate person's affects and emotional feelings such as enjoyment. Such needs upon the review were: satisfaction, enjoyment, entertainment, pleasure, aesthetics, and affection.

Third, slightly largest theme, namely *personal integrative needs,* includes all needs related to person's willingness to feel confidence and high self-esteem. Such needs based on beta review were as follows: identification, commitment and loyalty, joy of success and achievements, altruism, need for control, self-expression, self-esteem, feel of competence, feel of power, feel of obligation, credibility, self-disclosure, autonomy, feel of worthy, getting feedback, challenging oneself, domination, completionism and progress, and finally pride about accomplishments.

Fourth theme, namely *the social integrative needs,* includes all needs related to audience willing to be part of a group, and willing to be recognized as part of the group. Such needs, driving OC use, were as follows: social interaction, recognition, sociability, reputation, reciprocity, communication needs, social status, interpersonal and social relationships, social identity, making friends, competition, challenging others, helping others, approval, inclusion, relatedness, collaboration and finally provocation.

Final and the fifth theme, namely *tension and stress release needs,* includes all values related to need for: ”escape and diversion from problems and routines” (Sangwan, 2005). Following value drivers found to belong this category: process experience, relax, escapism and immersion. Full list of sources represented in APPENDIX 1 – Value drivers of online communities.

4.5 Online community value propositions

OC literature review revealed couple of main classes of value propositions, which often are mentioned in the OC literature. Those were *good government*, *sociality*, *usability and system quality*, *content & information* and finally *rewards and incentives*. Full list of value proposition sources represented in APPENDIX 2 – Value propositions and offerings of online communities.

OC literature suggest that *good government* is one of the key matters to take into account, when creating value propositions for OC software and to get people participate in OC usage. Below table (Table 3) consist of all sub-value propositions and service offerings related to those value propositions related to good government, trust enhancement and credibility. Initiatives within this class primarily tend to build trustworthy climate to the community.

Table 3 – GOOD GOVERNMENT related value propositions and offerings

Value propositions	Sub types of value propositions	No of papers	Offerings	No of papers
	Trust	22	Purpose statement	11
	Commitment	11	Offline events and activities	7
	Policy / policies	10	Trust enhancement tools	3
	Involvement	8	Support and moderation	3
	Membership	6	Habit creation	3
	Competence	6	Rules and guidelines	2
	Governance	4	Rituals	2
	Benevolence	4	Etiquette	2
	Empathy	4	Welcoming messages	1
Good government	Welcoming athmosphere	3	Role models	1
	Alleviating fear (e.g. losing power and face)	3	Planting conversations	1
	Receptivity & receptiveness	2	Participation of experts	1
	Honesty	2	Granting sufficient resources	1
	Integrity based trust	1	Examples	1
	Transparency	1	Behavioral modeling	1
	Justice	1	A few clear regulations	1
	Pro-sharing norms	1	Verbal persuasion	1
	Control	1		
	Evolution of standards	1		
	Mentoring	1		

The *good government* value proposition class is accompanied of all propositions related explicitly to improve user's trust toward the system and the activity. Following trust enhancing value propositions were suggested: policies, general commitment and involvement toward activity, benevolence, receptivity and empathy toward users. Also membership of the community, competences which user appreciate, welcoming atmosphere, honesty, transparency, justice and pro-sharing norms (openness) were to be offered. Also control, evolution of standards, fear alleviation, mentoring and fears handling (as to losing power and face) processes were mentioned.

As for concrete *offerings* to foster trust, the literature suggest following strategies: putting in the place a clear purpose statements and clear regulations and guidelines of the community and a subsequent support system and mod-

eration functions. Fostering complying with etiquette. The community is to arrange offline events and activities, and other rituals, to offer technical tools to enhance trust and for example by planting conversations, and sending welcoming messages and thus showing good example. It's also vital to granting sufficient resources to the maintenance of service and put efforts to involve expert level members into the activity and thus offering competence, and role models. It's also important to tend to creating common habits. If nothing else works, then even persuading verbally can be efficient strategy.

The second major value proposition class pinpointed was *sociality*. It consist all value propositions linked to social nature of activity (Table 4). Such value propositions were as follows: general sociality, spirit and sense-of-community, reciprocity, a dialog between people, feedback from others and contacts.

Table 4 – SOCIALITY related value propositions and related offerings

Value propositions	Sub types of value propositions	No of papers	Offerings	No of papers
Sociality	Reciprocity	9	Communication and dialog tools	9
	Feedback from others	7	Browsable user profiles	8
	Dialog	6	Feedback functions	7
	Sociality	5	Social presence and awareness functions	5
	Spirit and sense of community	4	Sharing tools	4
	Contacts	1	Private messages	3
			Achievements	3
			Chat	3
			Group formation tools	3
			Networking tools	2
			Avatars	2
			Discussions via forum	2
			Commenting	2
			Peer support mechanism	2
			Status information	2
			Instant messages	2
			Tools to show empathy	2
			Personal styles	2
			Tool to find friends	1
			Collaboration tools	1
			Non-verbal signs	1
			Member directory	1
			List of masters	1

Findings of literature review suggest that following *offerings* to be created to enable fulfilment of sociality value propositions: offering excellent communication, dialog, feedback, private message and commenting tools, such as discussion forum, chat and instant messages. Enabling browsable user profiles, tools to show achievements, editable avatars, non-verbal signs, status information, and other functions to be able to adjust personal styles and enhance social presence and awareness of others and support information richness. As information seeking is a core behavior of OC, suitable content sharing tools are to be offered. As finding others and making friends is key activity, a suited group formation tools, member directory and list of masters, collaboration tools and peer support mechanism to be offered. Trust is and tools, which enable showing empathy, foster benevolence.

The third major value proposition theme *usability & system quality.* This theme consisted of value propositions pertaining to trustworthiness toward the technical solution itself (Table 5). Based on the meta review following sub types of value propositions were identified: general usefulness and convenient system, satisfying user interface design and usability, privacy, general ease-of-use (incl. Easy-to-use navigation and search), reliability, interactivity, synchronicity, security, playfulness, simple task design, cognitive absorption, realism, quality of system, personal uses, visual clarity and flexibility of task flow.

Table 5 – USABILITY & SYSTEM QUALITY related value propositions and offerings

Value propositions	Sub types of value propositions	No of papers	Offerings	No of papers
Usability & system quality	Usability and UI design	12	Privacy protection	8
	Usefulness	10	Searching and filtering tools	7
	Privacy	8	Privacy settings and levels	6
	Easy-to-use navigation	8	Adjustable personal info	3
	General ease of use	6	Data storage	3
	Useful or convenience system	5	Easy information retrieval or recovery	2
	Reliability	4	Fast loading and response times	2
	Interactivity	3	Faq	2
	Security	3	Animated demos and videos	2
	Synchronicity	2	Diary	1
	Playfulness	2	Statistics	1
	Ease of search	1	Easy info adding tools	1
	Simple task design	1	Tutorials	1
	Cognitive absorbtion	1	Segment users by their experience	1
	Realism	1	No risk-trials	1
	Quality of system	1	Contextual information	1
	Personal uses	1	Understandable terminology	1
	Visual clarity	1	Multilingual	1
	Flexibility of task flow	1	Cross-platform integration	1

Subsequent usability and system quality related *feature offerings* were suggested as follows: privacy protection and settings to adjust personal information was found one of the most significant one. Tools linked to information, such as searching and filtering tools, data storing capabilities, information retrieval and recovery tools, fast loading and response times, FAQ were to be offered. To make system use easy and safe animated demos and videos, tutorials, no risk-trials, understandable terminology, easy tools to add information to be offered. To enable personal uses of system, diary tool, statistics to be designed. Other useful tools mentioned were: enabling different user segments, offering contextual information, creating multilingual service, and finally establishing suitable cross-platform integrations to other web services.

Third core value proposition theme was *content and information***.** This value proposition theme included those, which related to information and content distributed in the community (Table 6). Following sub themes were identified: quality of content, content accessibility, informativeness of content, quantity of content, interesting content, relevancy and usefulness of content, quality of presentation i.e. how content is presented, content functionality, and structure of content.

Table 6 – CONTENT AND INFORMATION related value propositions and offerings				
Value propositions	**Sub types of value propositions**	**No of papers**	**Offerings**	**No of papers**
Content & information	Quality of content	8	Content and information	7
	Content accessibility	4	Updated content	5
	Informativeness of content	4	Content creation tools	1
	Quantity of content	4	Show popular content	1
	Interesting content	4	Most viewed content	1
	Relevancy and usefulness of content	4		
	Quality of presentation	2		
	Content functionality	2		
	Structure of content	1		
	Informative content	4		

With regards to *offerings* related to this value proposition theme, suitable updated content and information were to be offered. As easy as possible content creation tools were also to be offered to foster information accumulation, content recommendation tools. The literature suggested also means to showing popular and most viewed contents, and to show contents that are of favour of other users.

The fourth value proposition theme, namely *rewards and incentives,* includes all value propositions, which promises any kind of rewards or external incentives (Table 7). This theme consisted of following value propositions: public recognition, feeling of competence, general incentives, acknowledgement, reputation, social reward, activity reward, encouragement, economical incentive, enforcements, supportive climate and material reward.

Table 7 – REWARDS AND INCENTIVES related value propositions and offerings				
Value propositions	**Sub types of value propositions**	**No of papers**	**Offerings**	**No of papers**
Rewards and incentives	Public recognition	12	Status and activity levels	8
	Self efficacy strengthening	10	User roles	8
	General incentives	8	Acknowledge helpful contributions	5
	Acknowledgement	5	Achievements	5
	Social reward	5	Rewards for accomplishments and recognize contributions	4
	Reputation	4	Rating schemes	4
	Activity reward	4	Status symbols	3
	Rewards for quantity of contributions	3	Gifts	2
	Encouragament	2	Power levels	2
	Economic incentive	2	Point collection mechanism	2
	Enforcement	1	Visibility	2
	Supportive climate	1	Privileges	2
	Material reward	1	Career advancement	2
			Incentive to enhance status	1
			Visibility of contribution	1
			Monetary or economic reward	1
			Credits and virtual credits	1
			Ceremonies	1
			Voting	1
			Ranking system	1
			Leader boards	1
			Honor, loyalty program	1
			Rewards for quality of contribution	1
			Reward for uniqueness of contents	1

As for concrete *offerings* how to make these value propositions materialize, following ones were suggested: status and activity levels, tools to enhance status were suggested. Distinct user roles with different power levels and honour and loyalty program were to be offered. Means to acknowledging and recognizing quantity, quality and uniqueness (or helpfulness) of contributions and accomplishments e.g. by giving visibility for them, arranging ceremonies, giving gifts, monetary and economic rewards, or credits to be offered. Consequently ranking system, point collection mechanisms and leader boards to be offered as well as other means to showing achievements to other users. To enable peer feedback, rating and voting schemes, to be designed. Other means to foster self-esteem and motivation, e.g. by offering privileges, and career advancements were suggested.

In the below picture (Figure 3) the value driver classes and value proposition classes are summarized.

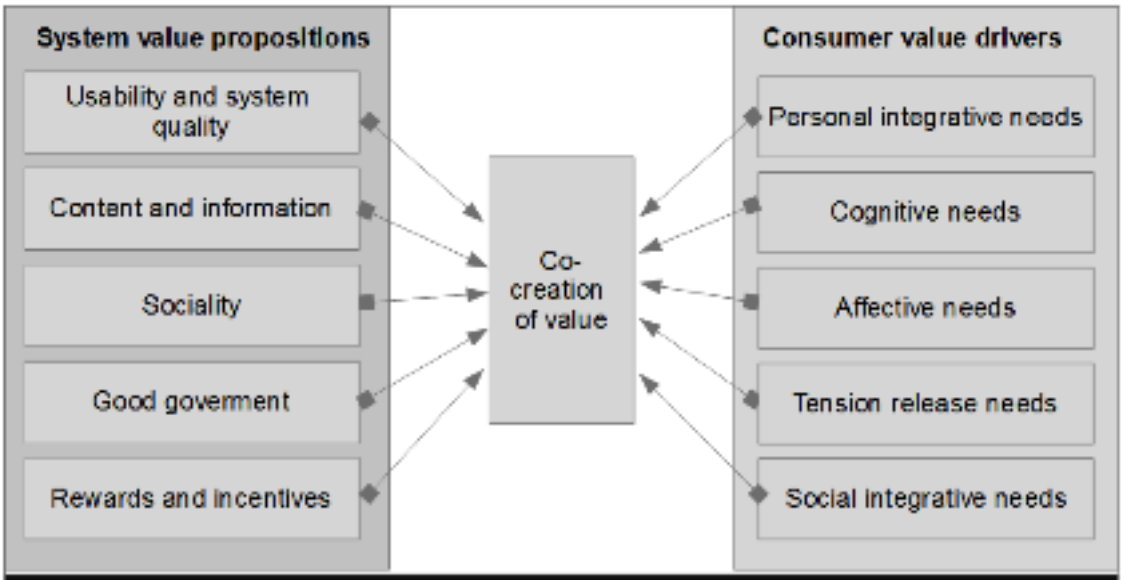


Figure 3 - Online community system value propositions and end-user value drivers

To sum OC literature review resulted in a list of actual customer value drivers, system value propositions and service feature offerings. Then above figure of online community value co-creation picture was depicted (Figure 3). In the following paragraph, a methodology for the field study of this thesis is being examined and justified.

5 METHODOLOGY

In this paragraph firstly an interpretive case study approach will described. Then the chosen Critical Success Chain methodology and laddering interview are being reviewed. Then the process of the methodology is clarified, as well as methodology will be reasoned. Then the ways research objectives are answered are to be addressed. In the following sub-paragraphs, the pre-study preparation stage is examined along with case study description, participant description and so forth. This chapter is to be a groundwork for the following field study chapter.

5.1 Interpretive research approach

In this first chapter of the methodology paragraph, the intellectual foundation of this study, namely 'interpretive' study paradigm is being discussed and justified. First in-depth case study is discussed, and then 'positivist', 'critical' and 'interpretive' types of case study is being explored. Then generalizations and theory use possibilities are discussed and finally the chosen study paradigm will be justified.

Importance of social and human issues related to computer-based information systems has been recognized more than two decades ago. This has led some IS researchers to adopt empirical approaches in their study. Empirical, particularly 'interpretive' in-depth the case study research, helps unearthing human interpretations and meanings (G. Walsham, 1995) of information systems (Walsham, 1995) Drawing on Klein & Myers (1999), an in-depth case study is included in the category of field study together with ethnographies.

What is the case study more precisely? Klein & Myers (1999) refer to Yin (1994, pp. 10-11) who defined case studies as something not relying on participant-observer data, as ethnographies do. Case studies according to them does not require long periods of time in the 'field', and does not depend on detailed

observational evidence (Klein and Myers, 1999). H. Govindji (2008) in his thesis, refer to Yin (2003), who has defined case studies as follows:

> ”Case research has been defined as an empirical inquiry that investigates a contemporary phenomenon within its real -life context, in particular when the boundary between the phenomenon and context are not clearly evident (Yin, 2003)”.

Walsham list the possible sources for evidences in case study: documents, archival records, interviews, direct observation, participant observation and physical artefacts. He continues, that interviews are an important data sources in case study. (Walsham, 1995)

Klein and Myers mentioned about different approaches: 'positivist', 'critical' and 'interpretive' (Klein and Myers, 1999). Walsham clarify the epistemological differences of those. 'Interpretive' approach is a completely different approach to 'positivist' view. Positivist view is considered ”as the position that facts and values are distinct, and scientific knowledge consist only of facts” (Archer, 1988). Former, namely 'interpretive' or 'non-positivism' sees tha**t** ”facts and values are intertwined and hart to disentangle, and both are involved in scientific knowledge”. (Walsham, 1995) Walsham also mention 'normativism', which refer scientific knowledge as ideological and conductive thing to particular sets of social ends (Walsham, 1995). Normative approach, however, relates more to design science paradigm, which is not of interest of this study.

Klein and Myers (1999) suggest that concepts 'qualitative' and 'interpretive' are easily mixed up, if they're not understood fully and clearly. They posit that qualitative actually may or may not be 'interpretive', depending upon those of the underlying philosophical assumptions of the researcher. Given the definitions of different case study approaches, for example, they imply that case study research can be either 'positivist' (example: Yin 1994), 'interpretive' (example: Walsham 1993) or 'critical' (Klein and Myers, 1999). Therefore it's good to keep in mind that those two concepts are not synonyms to each other.

Drawing on Walsham (1995), case study can lead to different kind of output and generalizations. Walsham mention Eisenhardt (1989), who noted that output of case study research may be *concepts*, *a conceptual framework*, *propositions* or *mid-range theory* (Walsham, 1995). Propositions refer to generalizable theoretical propositions (Walsham, 1995). Walsham extends the previous work and suggest four types from interpretive case studies, which are as follows: *the development of concepts*, *the generation of theory, the drawing of specific implications*, and *the contribution of rich insight*.

Literature mention limitation of case study; typically there's one case under study at a time. However, some of the scholars seems that this may not be the problem. Govindji (2008) point to Flyvbjerg (2006) who has argued that if the case if appropriate for research and chosen carefully, then even a single case study can be generalizable (Govindji, 2008).

To sum, an interpretive approach is adopted for this study. There are multiple reasons for choosing it:

Firstly interpretive approach enables searching deep insights into human and social issues and helps searching and understanding subjective interpretations, meanings and experiences of people. (Walsham, 1995) Thus choosing this approach help unearthing the drivers of find database users (and to answer sub-question 1).

With interpretive research orientation it's possible to better understand what types of influences potential system value propositions and system features have for end-users. In addition case study will enable to explore those features enhancing certain end-user experiences. Thus it enables searching information systems value to its end-users. Therefore detecting the core features become possible. (Govindji, 2008) Hence choosing this approach it become possible understanding what value propositions and what feature offerings the find database service should offer to its users (and to answer sub-question 2).

Thirdly, as Govindji (2008) states, it also makes possible to searching on a field that has not studied so far. Find database context has not yet been studied, so choosing this approach offers a good basis for this kind of novel discovery. Therefore it's fairly to say that case study approach matches the main research objectives concerning research questions and approach of this study.

5.2 Methodology

Prior IS planning literature suggest different requirements elicitation techniques and methods as mentioned in the above section; techniques range from a traditional techniques to the cognitive techniques and other types of techniques. However, this study adapts methodology suggested in CIS framework. It includes a *Laddering interview* as a means to elicit requirements data rich in user preference structures and reasoning for IS systems. For data collection and analysis this study adapt a Critical Success Chain (CSC), coined by Peffers et al. (2003), is a methodology for user-centered, broadly participative and strategic IS planning. It helps gathering and analysing requirements data based on users' preference structures and reasoning for IS features. The goal of CSC is to result in rich models of justifiable feature sets that can enable valuable experiences for users.

CSC methodology has many significant strengths in terms of this study scope; one of the most influential is that CSC is appropriate as it enables to gathering information about users values and needs. This and other rationale, which it was chosen to be applied technique as part of this study will be further reviewed and justified in the following chapter.

Before introducing the further rationale for choosing this methodology, the theoretical foundation of CSC methodology is shortly discussed.

Foundations of Critical Success Chains methodology

Peffers et al. (2003) coined the CSC, and it is an application Critical Success Factors (CSF) methodology, Personal Construct Theory (PCT) (Peffers et al., 2003) and Means-End Theory (Gutman, 1982) (Vargo and Lusch, 2004).

Rockart (Peffers et al., 2003) coined critical Success Factors (CSF) and it is widely used method for identification of important performance objectives, namely critical success factors, for the firm's information technology (IT) investments (Peffers et al., 2003). Its core is the idea of expressing performance consequences, which are in relation to firm objectives. According to Peffers et al. (2003) CSF is a top-down concept in its nature. It's good for generating strategically focused IS project ideas.

Another fundamental theoretical construct behind CSC is Personal Construct Theory (PCT) coined by George Kelly. PCT is a theoretical construct which model the relationships between states of the universe, and the consequences of those states, and what are the impacts of those consequences on their individual values (Peffers et al., 2003).

Third theoretical construct underlying CSC is Means-End Theory invented by Gutman (1982). According to Tuunanen, Peffers, Gengler, Hui, and Virtanen, (2006), it suggest that services are means to reach a favored end states:

> "product attributes are relevant to consumers for the consequences derived from consumption behavior and that these consequences are relevant for the personal values they help satisfy for the consumer".

Common in all four concepts (PCT, CSF, Means-end and CSC) is that they either implicitly or explicitly model the relationships between a certain root cause and an outcome of that in terms of individual values. Put in other words, whereas a PCT tends to understand meaning of different states of universe to the one's values, via those of states consequences (Peffers et al., 2003), CSF method is tending to pinpoint those IS features, whose consequences can be linked to firm's objectives and needs (and therefore values) (Peffers et al., 2003). In the below picture the Critical Success Chain is illustrated (Figure 4).

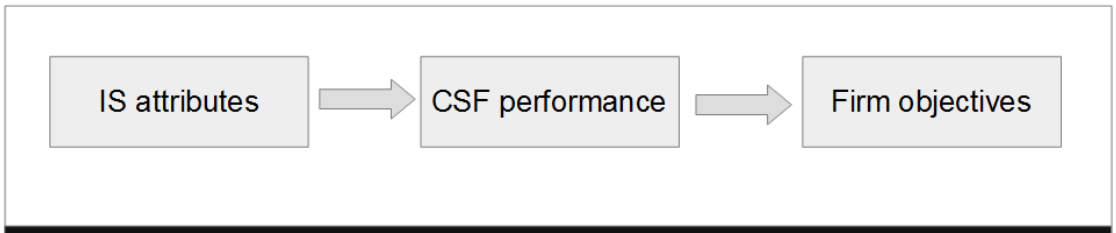


Figure 4 - Critical Success Chain, adapted from (Peffers, Gengler and Tuunanen, 2003)

Peffers et al. (2003) suggest CSC methodology to be used with a 'laddering', a PCT-based data-gathering method, to elicit information about people's knowledge structures. Laddering interviewing technique rely on observation of how people differentiate among stimuli (Peffers et al., 2003). Laddering employ ask-

ing technique, which focuses not just on ideas that pop up, but also the reasons behind them. In order to extract reasoning structures, a set of subsequent questions of the sort: 'Why this is important to you?' is being asked. This aims at unearthing the value and goal structures behind actual explicitly named hopes and wishes and preferences related to IS features.

Based on the literature, the laddering is widely and successfully used in different fields of study (such as Reynolds and Guttman, 1988, Klenosky et al. 1993, Gengler and Reynolds, 1995) (Peffers et al., 2003). As CSC is being enhanced with PCT-based laddering interview technique, the CSC methodology not only produces IS features, but answers why they're preferred, and why they're important to the end-users.

To summarize CSC builds upon three concepts (CSF, PCT and Means-End), actually being loyal to the original ideas of them. Building on prior work of the intellectual foundations of PCT, the extended framework CSC has a one-to-one relationship with PCT, and therefore it is a particular case of PCT (Peffers et al., 2003). CSC methodology produces chains of system features, performance consequences and firm / individual values and objectives (Peffers et al., 2003). This CSC has certain benefits; it helps communicating the features, consequences and values, and thus gaining buy-in to the features. More pros and cons are listed in below chapter.

5.2.1 Rationale behind choosing Critical Success Chain

CSC methodology has many strengths besides being strategic, participatory and widespread; CSC is developed particularly for the needs of idea generation phase of IS planning. Here are some pros of this methodology basing on various literature:

- It shows why people prefer certain IS feature (Peffers et al., 2003) i.e. answer to question, why this feature is important one.

- It provides rich information of real users. I.e. it describes IS attributes in terms of features and purposes, to qualify consequences and outcomes (Peffers and Tuunanen, 2005, Peffers et al., 2003).

- It supports five of the six information (based on information theory) processing needs for IS planning (Peffers and Tuunanen, 2005).

- It results in rich models that are valuable to communicate importance relationships (Peffers and Tuunanen, 2005, Peffers et al., 2003) i.e. helping to gaining buy-in to the project.

- It considers a wider range of development ideas and considers the full range of options to accomplish desired objectives (Peffers et al., 2003).

- It balances important strategic, tactical, and operational systems in the development portfolio (Peffers et al., 2003).

- It better optimize the allocation of resources for maintenance and small systems (Peffers et al., 2003).

- It's designed to be economical with short, structured interviews and a very constrained ideation workshop (Peffers and Tuunanen, 2005).

- It does not require of participants to understand any underlying concepts of the methodology in order to participate (Peffers et al., 2003).

- It helps gathering such service requirements that have potentially high customer value. (Peffers et al., 2003)

There's also some limitations reported to CSC methodology. For example it may not be the best alternative for the rest of the IS planning phases, such as evaluation, feasibility and sourcing study, and making the decisions (Peffers et al., 2003). It however, based on Peffers et al. (2003), may provide some implicit support for the second and third activities.

Reported limitations of CSC are expressed as follows:

- There's no clear proof than CSC procedure works better than CSF or any alternative technique (Peffers et al., 2003).

- Question about information richness was assessed in Peffers and Tuunanen (2005) (Peffers and Tuunanen, 2005), but it was not clear that it was better than other techniques.

- Results from use of CSC are dependent on the skill, diligence and attentiveness of the analyst (Peffers and Tuunanen, 2005, Peffers et al., 2003).

- Like other qualitative methods it is expensive (Peffers and Tuunanen, 2005), or at least time consuming for the researcher.

Peffers and Tuunanen (2005) reviewed five participative methods for IS planning in in their study based on how they provided support for information processing needs of IS planning. The study question was how well tested methods fulfill needs of providing rich information to the correct decision-making.

The compared methods in the Peffers & Tuunanen's (2005) study were CIS, Delphi, Focus Groups, ETHICS/SADT, TQM and MCDM.

To summarize their study, they put that each methods they compared had its own strength over others. In study results they claim that no single method proved to be superior in terms of information richness. They also stressed the meaning of the circumstances and use to which IS planners need to put it, as a critical mediator of the method's success (Peffers and Tuunanen, 2005).

Based on above implications, it's fair to say that employing some other method than CSC, in other circumstances can results in better outcome. This finding is consistent with other studies which somewhat suggest that the methods should be used in combinations (Brooks, 1986, Nuseibeh and Easterbrook, 2000, Robertson, 2001, Coughlan and Macredie, 2002, Hickey and Davis 2004). E.g. *Focus groups* and *Brainstorming* could be feasible ones to provoke innovation of undreamed and unconscious requirements, thus they should be further studied as a part of CSC methodology.

5.2.2 Critical Success Chain procedure

Peffers et al. (2003) has developed four step procedure of CSC to implement CSC method for IS project idea generation. They divide process into *Pre-study Preparation, Data Collection, Analysis* and *Ideation Workshop* phases. (Peffers et al., 2003)

In the pre-study preparation phase Peffers et al. (2003) recommend to determine scope and participant of the study, as well as collect idea stimuli. In this phase it's necessary to select participants that represent those views that are of interest to research topic. They do not restrict to only employees of company, but allow suppliers, customers, experts; even other stakeholder groups can be used (Peffers and Tuunanen, 2005, Peffers et al., 2003).

Concerning the sufficient number of participants, Peffers and Tuunanen (2005), argue that ”qualitative researchers in the social sciences have found that samples in the range of 15–30 people [...] are sufficient to gather nearly all of the ideas about an issue from a population.” (Peffers and Tuunanen, 2005). Also stimuli collection is made in this phase as a preparation to the actual Data Collection phase (Peffers et al., 2003).

In the actual Data Collection phase, drawing on Peffers et al. (2003), those personal constructs (representing system features, performance consequences and personal values) are to be collected from participants. Participants are asked to rank-order stimuli on importance and then series of why questions are being asked in a certain manner. Several chains are to be collected from each participant. (Peffers et al., 2003) This phase is correspondent with a Laddering interview process, which is described later on in its own paragraph.

In the Analysis phase CSC models are to be constructed by using those constructs collected by interpreting individual statements and labelling consistently across participants (Peffers et al., 2003). The process of building CSC

models starts by clustering collected chains into matrixes using e.g. Ward's method (coined by Aldenderfer & Blashfield, 1984) to minimize the variance of the constructs in each cluster. Then resulting clusters are to be examined focusing solutions with 3-10 clusters, and finally to settled on a cluster models that seems to be coherent and meaningful. (Peffers and Tuunanen, 2005)

Given there's feature clusters accompanied, each cluster are then to be aggregated or mapped into a network model (Peffers and Tuunanen, 2005) also called socially constructed CSC models, where nodes represent the constructs and links represent the connection between the constructs in the chains (Peffers and Tuunanen, 2005, Peffers et al., 2003). Then redundant links are then to be eliminated. In the final CSC maps attributes are shown to the left, critical success factors in the middle and personal goals on the right (Peffers and Tuunanen, 2005).

Peffers and Tuunanen describe the resulting social constructed CSC map as follows:

> "CSC model represents an aggregation of applications or features that a number of people thought would be important to their lives and the reasons why, expressed in terms of performance and personal values."(Peffers and Tuunanen, 2005)

Final phase of Peffers et al. (2003)'s CSC procedure is the Ideation Workshop. Workshop aims at evaluating CSC network models to a feasible IS project proposals that satisfy the relationships implicit in the models. Sufficient technical and, business experts, as well as customers are to be involved. CSC procedure ends in creation of brief system descriptions and network business value models for each idea. (Peffers et al., 2003)

5.2.3 Laddering Interview

As above was indicated, this study employ a structured interview technique called laddering coined by Reynolds and Gutman (1988) (Tuunanen et al., 2006). Laddering is Personal Construct Theory based data-gathering method (Peffers et al., 2003), which according to Nuseibeh & Easterbrook (2001) belongs to class of cognitive requirement elicitation techniques, and which originally was specified to gather requirements information for knowledge-based systems (Nuseibeh and Easterbrook, 2000).

Laddering technique is based on observation of how people differentiate among stimuli (Peffers et al., 2003). It employs asking technique, which focuses not just on ideas that pops up, but also the reasons behind them. Laddering proceeds by asking subsequently the question 'why this is important to you?' More specifically in laddering analyst gives a participant a choice within a product category (i.e. stimuli theme) and then asks the participant to describe important consequences related to that feature. (Tuunanen et al., 2006)

Laddering interview has certain process, which is well designed by Peffers et al. (2003): process start with stimuli collection. In stimuli collection the suggestion are asked from each participant in a short pre-interview conversation.

Collected stimuli units are then aggregated to themes. The participant are then in the actual interview asked in which order to prefer these themes. After adjusting stimuli themes to order, laddering proceeds through a series of questions for the higher ranked stimulus: "Why would this project be important to the organization?" or, if the participant is a customer or end-user, "Why would this project be important to you?" These questions are to elicit expected performance impacts related to these features. After that interviewer continues asking a series of subsequent questions 'why?' questions to collect data on associated concepts ending with the organizational or personal goals and values. Laddering interview ends up in the question concerning the specific attributes of the system, associated to the needs, which it fulfill; "What about this system makes you think it would do that?" (Peffers et al., 2003)

Laddering process that was ultimately used in this study is further described in the data collection chapter.

Aim of laddering is at collecting chains of features, reasons, and values from a number of participants. By doing so laddering helps at understanding the perspectives of system end-users, which in turn may help designing features that have potentially high customer value (Peffers et al., 2003). As a part of the technique, the distinct perspectives are aggregated into maps of how potential new system features connect to and could satisfy consumer values (Tuunanen et al., 2006). Laddering interview results in a complete description of a sequence of associations (Tuunanen et al., 2006) starting from a basic product feature through consequences and the final personal value satisfied, a so called a *means-end chain or ladder*.

Laddering interview has been used successful in some previous studies; Tuunanen et al. (2006) point out to Oberby et al (2004; 2005), who facilitated Means-end and Laddering to understand difference in personal values lay behind consumer choice, and vice versa, differences in how products translate into benefits that satisfy customers' value oriented goals. Peffers et al. (2003), is another example of how they defined high value IS development portfolios and high value IS feature sets for systems using laddering (and CSC) (Tuunanen et al., 2006). Furthermore Woodruff (1997) used laddering in understanding consumer value and Browne and Ramesh (2002), Browne and Rogich (2001) showed its potential in requirements gathering (Tuunanen et al., 2006). More recently Govindji (2008), Vartiainen and Tuunanen (2013) and Kaaronen (2014) have used laddering method to elicit CSC structures of their study samples.

5.3 Methodology reasoning

Previous IS literature has suggested that choosing methodology for a study is a highly error-prone task (Hickey and Davis', 2004). Hickey and Davis suggested that to be mature, requirement elicitation method should be chosen because "the analyst understands intuitively that the technique is effective in the

current circumstances." (Hickey and Davis 2004). This chapter will address that question.

As indicated above, the literature suggest some means to enhance user experience, such as using flow method to measure experience and blueprints to model better service process. However, the only way design user experience in the outset of IS lifecycle is to employ suitable requirements elicitation techniques for finding rich feature sets. To adapt consumer perspective in IS Planning demand wide participation and interactivity with the end-users of the system was suggested. This is of high importance in IS planning to avoid development of unnecessary features and requirements errors, those mentioned by Segars and Grovers (1999).

As discussed in CIS chapter, having CSC and laddering as a methodology for requirements elicitation is being widely justified using contemporary consumer theories; CSC methodology is so far been suggested successfully for elicitation purpose (Peffers et al., 2003). This is good, as this study aims to elicit rich requirements for the find database service.

According to Peffers and Tuunanen (2005), Peffers et al., (2003), CSC enables strategic wide and participative IS planning and to allow wide range of participants to be interviewed quickly. Due to user participation in the early phases, CSC may foster users' involvement, commitment and therefore buy-in and positive attitude toward the system, which is mentioned as importance success factors in organizational IS planning and RE literature. This is good, as at best this initial work behave as starting point for actual development of the find database; thus buy-in and commitment is needed from the participants.

Due to CSC is PCT Means-End based concept and it combines with laddering's probing question, it has also high possibility to elicit two types of requirements; it provides information from customers' implicit value driver and goal structures, which is important to shed light on how users get motivated on using system (Govindji, 2008, Peffers and Tuunanen, 2005, Peffers et al., 2003). Additionally it offers a three-fold view of *features, consequences and values (or objectives) of customer* on the topic. Thus the form it stems information from the context matches nicely to CIS's idea system value propositions and customer value drivers. Addition to that, one could also state that CSC has possibility to elicit unconscious and undreamed requirements (suggested by Robertson, 2001), at least better than traditional interview methodology. This is good, as using CSC directly answers to the research sub-question 1 (what are customer value drivers) and set a grounding to answer sub-question 2 (what are the system value propositions) of this study. Without drawing a map of desired consequence outcomes of the find database, it's impossible to create effective value propositions.

Furthermore, through theme maps CSC provides rich information for decision making in the following stages. This help managers to prioritize some features over another, and therefore it helps strategic planning. This is important when deciding over the first features for the find database software. As it has been discussed, it's overwhelmingly important to choose only important

ideas for implementation. CSC data gives important priority indication of each feature.

Thus by showing a rationale for choosing methodology to responding Hickey and Davis (2004), CSC has all necessary potential to be effective in the current circumstance.

However, to note some of the weaknesses of using CSC methodology only, especially concerning the sub-question 2 and to create sustainable system value propositions, different methods should be used in combination (Brooks, 1987, Robertson, 2001). Tuunanen posed that to ensure ideal results, CSC should be used together by other planning methodologies such as *Ideation workshops* (Peffers and Tuunanen, 2005, Peffers et al., 2003). *Prototyping* (Peffers and Tuunanen, 2005), or *Focus groups* (Peffers and Tuunanen, 2005, Peffers et al., 2003, Brooks, 1987). However, the ideation phase of CSC method is not undertaken within the scope of this study.

To sum this chapter, this thesis has discussed from different angles about development of innovative consumer information systems, designing innovative services and compelling value propositions. Designing IS that foster emotional experience thus quite much differs from development of traditional organizational information systems; Contemporary IS must adapt to a human and social perspective of consuming IS services. This is the main message of CIS framework, which is used as study lens here. It is also inherent in a chosen interpretive research paradigm of this study, which is calling for deeper understanding of human social phenomena. This idea is present in CSC methodology as well, as were discussed. Therefore the chosen paradigm and methodology should fit well to objective of this study.

5.4 Metal detecting and existing knowledge about it

In this paragraph, a short recap will be taken to realm of metal detecting hobby to prepare for the recruitment and the field study. This chapter aim also to inform those who did not yet know about metal detecting hobby.

A scant academic research has so far made upon the metal detecting phenomena. Thomas (2012), in her study, in which she interviewed some 262 metal-detector users, makes a good initial contribution on this topic. Her study shed light on the demographics, motivational factors and find recording behavior of the hobbyists in UK. Her paper presents results based on questionnaire surveys and observations of individual metal-detector users at certain selected metal-detecting rallies. Her dataset represent a good cross-section of metal detecting hobbyists participating in rallies in UK.

As for study findings, her study indicates the most relevant motivation factors of the respondents in metal detecting was *Interest in the past*. This was the most popular motivation, with 54.4% of respondents claiming that this initially motivated them. The least-popular response option was *Interest in finding items of value* with 7.7% of respondents claiming which motivated them. A little

less than a third a (28%) of respondents were motivated by the pleasure of finding things, regardless of their age or value (Thomas (2012).

Thomas (2012) study reveals interesting things as for hobbyists' patterns of documenting finds, usage of other find databases, cooperating with museums, donation and selling the finds. Thomas' (2012) results are as follows;

The majority of the respondents said that they recorded their finds (65.6%) with Portable Antiquities Scheme (PAS). PAS is initiative to record portable antiquities discovered by the hobbyists, operating across England and Wales (Thomas, 2012). According to Thomas (2012) a further 15.6% of respondents said that they never recorded finds. The results showed that only 5.4% of the survey responders had used the United Kingdom Detector Finds Database (UKDFD), a metal-detector user based independent online database. This indicates that a significant number do not share finds information yet. When asked how many metal detectorists had worked with archaeologists, just over one-third (36.5%) of respondents said that they had worked with archaeologists before. However, the majority (63.5%) answered that they had not. Furthermore, 17.1% of all participants said that they sold their finds, and 82.9% claiming not to do so. However Thomas suspect that this number may be lower than the actual number. Furthermore a majority of responders, 65%, had not donated finds to a museum. She notices that there might be a gender bias, as 92.4% of all interviewees were male. (Thomas, 2012)

In summation, the existing knowledge basis of this phenomena called metal detecting is yet quite sparse. Besides the main research objective, this study contributes to this knowledge base and defines the need of establishing a finds database for the hobbyists and museum personnel. As the by-product, this study further shed light on demographics of metal detectorists, and examines the user motivations toward finds documenting behavior. This hopefully contributes to better understanding of the phenomena and enable further in-depth collaboration and research projects to follow.

5.5 Case participants

In this chapter participant recruitment, stimuli collection and the interview processes are discussed.

This study utilized three-fold participant recruitment process, which employed recruitment campaigns in SME and NBA network, direct e-mail contacts in AMA, and snowballing method during first contact and later contacts. In order to elicit participation to this research, a list of two participants group was established; metal detecting hobbyists and museum and research professional. Former for the reason, as metal detecting finds database's primary user group is metal detecting hobbyists. The latter as it seemed good idea to obtain input from a representative group of museum and research people from outside the primary target group as well, as the find data the hobbyist would collect were

to offer these groups as well. Therefore archaeology, history research and museum officials in the favourable positions were invited too.

In first phase the primary recruitment channel for participant recruitment was SME (Finnish Metal Detectorists). To avoid excessive analyst influence in the selection process, SME's representative invited some of the key members of their network to join to the study. Before that, SME was provided a recruiting letter including introduction and motivation to this study, which then was distributed as e-mail in their membership networks. It was also published at their website. At the same time new thread pointing to that recruitment bulletin was published about this campaign at Aarremaanalla.com, which is leading metal detector hobbyists' forum in Finland. This first recruitment campaign produced a list of 11 hobbyist participants during the two last month of year 2013.

After two months of collecting registrations from SME, in the second phase, which started in the beginning of year 2014, a Chief of Data services at National Board of Antiquities (NBA) were asked to nominate at least 5 participants from their organization to take part in this study. Again to avoid excessive analyst influence, NBA took responsible of recruitment in their side. This campaign produced a participant list containing cross-section of 5 people from NBA. There were also some additional names recruited from NBA through SME additional to that. As there were not yet enough participants, an additional recruitment campaign took place at AMA. Those people were recruited based on the activity they had indicated in providing forum development ideas earlier on. This round produced 5 additional participants.

To complete the participant list during first contacts to the participants the participants were asked to mention some other persons that might be of use to this study. A following question was asked about as follows: "Can you recommend any person, who could be of use to this study? Please name a few." This is called as 'snowballing'. This method produced three additional name to the participant list.

Final round of recruitment took place after first round of interviews were undertaken. Having interviewed only 21 persons, as some of the participants were cancelled their participation, additional snowballing round was arranged to rise number of participants to 25 persons. Here the snowballing method was used again. This additional round produced three more interviews. Hereby there were finally 24 people who were interviewed (9 pros and 15 hobbyists).

Regarding demographics of participants, the age range was in between from 29 to 69. Majority, namely 19 of all participants were male (79%). All hobbyist participants were male. Majority of all NBA participants, namely 5, were female (56%). Majority of all participants, 17 persons, had 1-5 years of experience of the metal detecting hobby (71%). Minority of all participants, 7 persons, had extensive hobby experience with from 10 to 30 years (29%). Yet, there were 3 people who had been involving to this hobby for at least 30 years (12.5%). As for age range, majority of all participants were in the medium-to-high ages. Two most populated age ranges were 36 to 40 and the second most populated

44-49. The age seemed not significant predictor of whether person is a hobbyists or a professional.

In the below table (Table 8) the aggregated participant information is summarized.

Table 8 - Participants of the field study

ID	Gender	Age	Years of exp	Source	Education	Job	Type of user
M29	Male	29	4	AMA	2nd level	Worker	Hobbyist
M30	Male	30	5	SME	2nd level	Manager	Hobbyist
M36	Male	36	4	SME + 1 Snow Ball	3rd level	Researcher	Professional
M371	Male	37	5	SME	2nd level	Worker	Hobbyist
M372	Male	37	5	NBA	4th level	Researcher	Professional
M373	Male	37	5	AMA	2nd level	Worker (IT)	Hobbyist
M374	Male	37	1	AMA	2nd level	Worker (IT)	Hobbyist
M39	Male	39	2,5	SME	3rd level	Worker (IT)	Hobbyist
M44	Male	44	10	SME + 2 Snow Balls	2nd level	Worker	Hobbyist
M47	Male	47	30	SME	3rd level	Unemployed	Hobbyist
M48	Male	48	10	SME	2nd level	Worker	Hobbyist
M49	Male	49	4	AMA	2nd level	Worker	Hobbyist
M492	Male	49	3	AMA	3rd level	Manager	Hobbyist
M51	Male	51	15	SME	3rd level	Manager	Hobbyist
M56	Male	56	3	AMA + 1 snowball	2nd level	Entrepreneur	Hobbyist
M59	Male	59	30	AMA	1st level	Worker	Hobbyist
M63	Male	63	5	NBA + 1 Snow Ball	2nd level	Official	Professional
M65	Male	65	5	NBA	4th level	Chief	Professional
M69	Male	69	22	SME	3rd level	Retired Worker	Hobbyist
N29	Female	29	2,5	NBA	3rd level	Official	Professional
N40	Female	40	2	SME + 1 Snow Ball	4th level	Official	Professional
N45	Female	45	3	NBA	3rd level	Manager	Professional
N47	Female	47	2	NBA	3rd level	Researcher	Professional
N53	Female	53	30	NBA	2nd level	Worker	Professional

With regards to education levels, one hobbyist was having 1st level education (comprehensive school). The most populated education group, 11 persons, was those having 2nd level education (high school or basic worker level education). 2nd level education was far more common amongst hobbyists than NBA recruits. A little fewer people, 9 persons, had 3rd level education (lower or higher university degree or degree on applied sciences). 3 persons from NBA had 3rd level education and 6 people amongst hobbyist had 3rd level education. Three people

of all participants had 4th level education (doctor degree or graduate engineer). All of them were at professional position and were not hobbyists.

There were no any qualification requirements set to choose participants to this study. The key persons of both SME and NBA recruited the primary group of participants. There are no any guarantees that the sample represents the typical lead-user group.

5.6 Capturing stimuli ideas for interview

Once the participant list was incorporated, each participant was contacted by phone call to set up date for Skype interview. At the same time stimuli ideas were collected. In the stimuli collection, participants were asked to name the first thing that came to mind, when they thought about metal detecting finds database. If there was problem to answer to this question, additional question was asked about which feature would be of the most important to him/her s/he associate with finds database. The below table (Table 9) list the combined initial stimuli ideas collected. Based on this question, all except one participant could give at least one idea.

Table 9 - Captured stimuli ideas from pre-interviews

Times mentioned	Aspect of consumer behavior	Theoretical basis
10	**Documenting find information**	Classicfications and identifications for finds, Quality of identifications and contents, Sharp images, Attributes, such as age, Backgrounds of finds, Reference finds
5	**Exact location information**	As complete and exact information as possible, Adjusting location information afterwards
5	**Usability and functionality**	Availability, realiability, Clear and easy, Privacy & Sharing settings adjustable, Utilize mobile phone and meta information
4	**Search functions**	Easy-to-use search functions, Search functions also for complicated search, Lots of different search options, Sorting of information
3	**Availability / Sociability**	Open for everyone, Contact person behind the find

To continue toward establishment of stimuli lists for a laddering interview, the CIS's six elements, i.e. *social nature of use*, *context of use*, *construction of identities, service process experience, customer goals and outcomes*, and *participation in service production*, were used as a basis further elaborate those collected stimuli-ideas. The stimuli's collected were incorporated to elements of this framework to establish a theoretically sound stimulus list to undertake actual interviews. Idea was to embed the ideas of each CIS elements' theories to the description, so that the stimuli's would behave as hypothesis of the underlying theories. However, due to quite fast processing, some aspect of some theories may have been excluded out of the descriptions.

Below table (Table 10) illustrates the shortened final stimulus. To check complete stimuli descriptions, check out APPENDIX 3 – Stimuli descriptions in full.

Table 10 – Stimuli themes (shortened) based on CIS' elements		
ID	**CIS element & Stimuli name**	**Stimuli description**
1	**Social nature of use**	This means that using this database you can build social connections and network to other hobbyists.
2	**Context of use**	This means that this database functions well in different situations and contexts.
3	**Construction of identities**	This means that you can build your identity either as a professional person or as a hobbyist using this database.
4	**Service process experience**	The service process experience can mean positive user experience or the flow state occurring during usage situation
5	**Customer goals and outcomes**	This means that the database account not just yours but other different people's goals and motives.
6	**Participation in service production**	This means that you can participate in the operation of this service in a role suitable to you; either as hobbyist, or as professional.

5.7 Interviews

The data collection was accomplished using semi-structured laddering interview technique as it was described in the methodology chapter. Actual interviews were carried out using either Skype instant messaging and internet phone or regular GSM connection. All interviews were recorded using Avaer recording software in the case of Skype, and Windows recorder in cases of GSM interviews. About two hours prior to interview the participants were informed about stimuli ideas by e-mail (except the first one). This idea was acquired from the first interviewee who told that having more time to read stimulus, would make task more convenient. In fact, many participants informed the chosen stimulus by e-mail. The following laddering interview was structured based on Peffers et al. (2003) example.

Before actual interview, there was a warm-up discussion where the objectives and purpose of the interview were carefully discussed with participant. Also the phases of the interview were clarified. Nature of the data processing i.e. the confidentiality and anonymity of data was handled. Then a permission for recording the interview was asked. All interviewees gave permissions. The participant was informed about his/her role during the interview. The interviewer role was also discussed. After giving general instructions the participants were asked to answer to questions concerning their demographics. After getting demographic information the participants were asked about two (or in some cases three) stimulus they had chosen; whether these stimulus were their final choices. If everything was ok in this point, the actual interview could be started.

Next followed a series of questions for the higher ranked stimulus: "Why would this theme be important to you?" This was done to elicit desirable system features of interest to the participant. Typically the interview advanced

from the start on so that first 15 minutes analyst let the interviewee to tell freely about why s/he felt that these themes were so important. Below table (Table 11) illustrates the stimuli choices made by the participants.

Table 11 – Primary and secondary stimuli choices

	M3	M4	M4	M5	M4	N5	M3	M3	M5	M6	M2	M3	M3	M4	M6	M6	N4	N4	N4	M3	M3	M4	M5	N2
ID	**74**	**4**	**9**	**6**	**92**	**3**	**0**	**73**	**9**	**9**	**9**	**72**	**9**	**7**	**3**	**5**	**0**	**5**	**7**	**6**	**71**	**8**	**1**	**9**
1st stimuli	1	1	1	1	2	3	4	4	4	4	5	5	5	5	5	5	5	5	5	6	6	6	6	6
2nd stimuli	5	5	2	2	6	1	2	2	2	6	2	4	1	4	4	6	6	4	2	2	5	4	5	5
3rd stimuli															6									3

During that time features seeds and consequences related to them were mentioned; some of the interviewees could also verbalize their values without any questions. All ideas were noted so that they could be recalled later on. Analyst started having a basic idea of what kind of preferences (what features, and consequences) this participant had concerning the system in his/her mind, and putting all features and consequences in chains to the office program. This first 15 minutes laid the foundation for the next discussion rounds.

Then interviewer started going through those mentioned features asking probing questions: ”Why this feature would be important to you?” to illicit particular consequences expected from this feature. When participant had explicated his/her expected consequence, interviewer continued asking, ”Why this consequence is important to you?” This was done to elicit expected goal, motive or value. Typically these probing question produced new features as well. Analyst keeps noting them, while continuing probing questions. Sometimes interviewee had difficulties to determine why some things are important to them. In such case interviewer asked an additional question: ”What is the value, motive or reason behind the idea that this is important to you?” This helped some people to find ultimate benefit or value s/he seeks from that thing.

After having some values probed the following question was asked; “What about this system makes you think it would do that?” or ”How the system should do it?” or ”What features there should be that this goal or value would be fulfilled?” Many participants told the final question lead to an eureka moment for them. This seemingly helped interviewees to view the system from a different viewpoint. This final question produced some feature's which otherwise would seemingly have not been mentioned.

All feature, consequence and value chains were stored as tentative ladders during the interview. At the end of the interview, the system features proposed by the participants were compiled into a list on spread sheet. Those desired feature ideas were grouped by themes. Then in the wrap-up discussion, the participants were asked to reflect over their ideas and prioritize them from most important to least important (starting from 1 being the most important) and to assign a ranking number beside each feature. They were allowed to rank either groups or separate feature within groups. To some of the participants, who could not give straight precise answers, these features were sent by e-mail after interviews to provide the ranking numbers.

Each interview lasted approximately 1 ½ hours. The longest single interview lasted 3 hours. Interviews were recorded in AVI format. In the spread sheet of ladders, each column contained one feature – consequence – value chain. Every time interviewee mentioned new feature, a new column was taken in use. To make recap easier the time of each feature in the recording time was marked besides the feature name. For each chain, the system features (A), consequences (C) and values (V) were distinguished by the letters A, C and V, which preceded each statement. After the interview, the analyst listened to each interview recording again if necessary, to correct any deficiencies and to make interpretation sharper.

By repeating this procedure 24 times, in total 478 laddering chains (or personally constructed CSCs) and 851 attribute statements were recorded.

6 Data analysis

In this paragraph the data collected is to be analysed. This chapter follows the example of Peffers et al. (2003) employing thematic analysis. Over the course of this stage those individually collected concepts within CSCs were interpreted, relabelled, and clustered into 8 cluster themes and finally constructed socially construed CSC, as it was demonstrated in Peffers, Gengler and Tuunanen's (2003) paper. To provide a graphical representation, this analysis produced socially constructed CSC network maps for each clusters.

6.1 Aggregating concepts

Provided that every participant expressed their ideas using unique statements, a great variance in the expressions existed in the dataset. Therefore the concepts used in the chains first had to be interpreted and then made in to a consistent format. This process began with relabeling attributes using such general constructs, which had the same meaning that original concepts and which were generally enough descriptive and formal. As a result those uniquely worded statements with similar meanings were given the same label.

The process advanced in successive passes, so that every time the analyst read through the list of attributes, some of the constructs were consequently relabelled, some of them were merged to other one, and some of them were left unchanged, as they were to avoid loss of substantial information. In each pass the number of constructs, however, were going down and the "grain size" of the constructs were getting larger. Each chain was in a row and each construct was placed in a column at the spreadsheet.

After conducting first round of coding attributes, the clustering from individual CSCs to socially constructed CSCs started. Analyst had created already an image what feature themes were most important among the statements. Therefore drafting main feature cluster classes was not a difficult task once first list of general attribute code list was available. The work was made easier by

column sorting tool of Open Office. In the next reading-trough round a cluster cell with a cluster code was coded to the data.

In the next stage, the similar interpretation, and coding process to all consequences and values.

After first round of development of constructs (coding) there was 12 clusters and all individually mentioned attributes, consequences and values were captured into 186 attribute constructs, 139 consequences constructs and 137 value constructs. After preliminary coding round there were still extensive number of clusters and codes for attributes, consequences and values. Therefore analyst ran couple of additional merging rounds. As a result the concepts started to get polished and each constructs found their place from the clustered themes. Also couple of clusters was aggregated because they contained identical elements and many chains were relocated to another clusters. This process resulted ultimately in 8 attribute clusters, 160 attribute codes, 71 consequence codes and 41 value codes. Once again, the consequences and values were aggregated to the similar theme clusters as features earlier on. 11 consequence bundles and 8 value bundles resulted.

Finally the ranking values were calculated to each single features. The first ranking value was calculated as follows: feature being ranked as 1st, received 50 points (50 / 1), feature ranked 2nd received 25 points (50 / 2) and feature ranked 3rd received 16, 66 points (50 / 3). Once each feature had its ranking value, all ranking points within each feature code from different individuals' chains were summed. Finally the ranking values resulted were converted (by dividing) so that the best single feature accounted 100 points. Below tables (Table 12 and Table 13) depicts the 25 best features in ranking points.

Table 12 – Top 12 ranked features

Cluster	Attribute / Feature name	St 1	St 2	St 3	St 4	St 5	St 6	Σ	Ranking
HHH	Search and sort tool for finds and other content	3	1		4	8	2	18	**100,00**
CCC	Photos: the find	4	1	1	5	7	5	23	**66,39**
FFF	Adjusting content sharing and privacy settings	7	5		3	3	2	20	**62,86**
CCC	Location information: either exact and/or non-exact	4			3	3	4	14	**50,98**
AAA	Represent the finds on the map	1	1		3	3	3	11	**50,98**
DDD	Find identifying mechanism: community helps in identifying	2	3		6	6	3	20	**50,42**
BBB	Adding a new find to the system	2			5	2	4	13	**45,59**
GGG	Taking contact to other users (contact information & messages)			2	1	8	5	16	**45,45**
DDD	Museum, professional or admin level identification and validation	3	2		4	7	8	24	**42,34**
CCC	Location information: has to be exact	5				2	1	8	**39,21**
CCC	Context and find spot information	2	1	1		10		14	**36,00**
CCC	Find information	3			3	4	1	11	**34,03**

Table 13 – Top 13-25 ranked features									
Cluster	Attribute / Feature name	St 1	St 2	St 3	St 4	St 5	St 6	Σ	Ranking
DDD	Identification room and separate section for unidentified finds	6			2	1	7	16	**33,33**
CCC	Find information: Age and era of the find	4		1	3	3		11	**31,51**
DDD	Method and references behind identification (transparency)		1		4	1	5	11	**31,37**
FFF	Setup of hobbyists profile; interests, region, style, etc.	6			1	5	11	23	**24,28**
AAA	Overall ease of use or usability	1	2		4	2	1	10	**23,53**
BBB	Declaring finds to NBA		1			4		5	**23,53**
CCC	Find information: Size and dimensions of the find				2	2	1	5	**23,53**
CCC	Find information: Weight of the find				1	3	1	5	**23,53**
CCC	Find information: The material of the find	1		1	1	3	1	7	**23,25**
CCC	Current legal status and location	3				5		8	**22,47**
BBB	Instructive process: easy enclosure of information with pre-defined options	2	3		7	1	1	14	**21,88**
GGG	Discussion forum (for on-topic/off-topic)	3			1	4	4	12	**20,81**
FFF	Roles		3		5	2	1	11	**20,68**

Notable here is that this study undertook clustering analysis differently than in some previous works, which used CSC methodology (Govindji, 2008 Peffers et al. 2003); No Ward's method was used to minimize within cluster variance. Furthermore, the key determinant of clustering feature chains was the theme the attribute was pertaining to; e.g. all searching related features were aggregated into the searching tools cluster, and all communication features were aggregated into communication functions cluster. Also it's notable that there was only one analyst working on the project.

6.2 Analysis of Consequences

In the next phase the CSC maps were developed upon coded chains. A ”color analysis” was used to check the bilateral order of appearance of the consequence constructs (see below Table 14).

To conduct the color analysis, a new spreadsheet was created consisting only those feature codes having links to consequence codes and value codes. Then the sorting tool at spreadsheet was used to sort all consequence codes of each attribute construct on top of each other’s. Then each same or similar consequence codes from different individuals' chains were colored by same color.

Then the pattern of consequences in relation to preceding and superseding consequences was able to found. Like in the above example, the primary consequence seems to be that the credibility and quality of information improves by identification rating tool. Secondary consequence seems to be that it leads to social and self-rewards. In the event of some features, there was no clear occurrence pattern in the way the consequences emerged. However using this method, the analyst was able to find the order in which those consequences were mentioned on an average in the interviews.

Table 14 – Example of color analysis method

Feature	Consequence 1	Consequence 2	Consequence3
Identification evaluation by rating / voting	Trustworthiness, noteworthiness and authenticity of persons can be assessed	Feeling meaningful by gaining social and self-reward, being thanked, noticed, being appreciated and recognized, praised up, gaining honor and being identified	Increase motivation commitment and enthusiasm to participate: sense of community and sense togetherness
Identification evaluation by rating / voting	Increase credibility of the information: authenticity, trustworthiness, transparency of information		
Identification evaluation by rating / voting	Quality of information gets better: faster, up-to-date, complete, consistent, coherent, authentic, trustworthy, correct and precise information	Trustworthiness, noteworthiness and authenticity of persons can be assessed	
Identification evaluation by rating / voting	Increase motivation commitment and enthusiasm to participate: sense of community and sense togetherness	Feeling meaningful by gaining social and self-reward, being thanked, noticed, being appreciated and recognized, praised up, gaining honor and being identified	Increase credibility of the information: authenticity, trustworthiness, transparency of information

6.3 Building Network Maps

Given the data was put in themes, clustered and ranking data was marked, the network maps were drawn. Open Office Draw tool was chosen to drawing CSC network maps. First the most common attribute box in each cluster was put in the center. Then the boxes of consequence codes adjusted with results of color analysis were drawn to the map. Arrows were adjusted to illustrate the associations between attributes, consequences and values. The order in which the consequences are drawn on the map, illustrates the order in which they averagely were mentioned in interviews i.e. the order is basing on the above mentioned color analysis. Then most often mentioned values of this cluster were drawn on the map and arrows connected to them from the ultimate consequence boxes.

To make these maps more readable, and to avoid lines crossing each other, some redundant links were removed. Boxes were also rearranged several times to ensure optimal readability. Finally the ranking value figures, which demonstrate the relative importance of the construct, were added to the map. As a result from this phase socially construed consensus models were born.

The map, from left to right, consist descriptions of desired system attributes, the resulting desired consequences (also CSFs), and related personal motives, goals and values. Therefore the horizontal dimension represents the ”state-consequence-value” dimension. Arrows between boxes depicts ”reasons why” links, which indicate the relationships between each attribute and consequence, and consequence and value. Even though some of these links may sometimes represent causality, first and foremost they represent the order in which they were mentioned in the interview, as were suggested in color analysis.

In sum in this research the CSC method was used in the way it was suggested in Peffers et al.'s (2003), except few points: no Ward's method variation was used to minimize within-cluster variance, nor was two analyst used and consensus method used to conduct concept coding. Due to limited time resources no ideation workshop was conducted to further develop requirements this master thesis.

7 Findings

In this paragraph the findings from the field study are explored. Firstly a frequency and preference of stimuli choices are being reviewed. After that a brief look will be taken on the stimuli distribution upon feature clusters, consequence bundles and value bundles. Those chapters, which concern stimuli distributions are specifically, suited for those readers interested in gaining view on analysis how the participants of the study perceived CIS's theory elements. This has some potential implications for the applicability of CIS's current elements in this context. The following sections are particularly suited for those readers with managerial aspirations introducing the network maps and critical success chains of find database, and the value bundle distribution on specific feature clusters.

7.1 Data distribution on stimuli themes

In total 478 chains were documented during data collection phase. Below table (Table 15) depicts the distribution of chains on the stimuli themes. Of all, the stimuli theme number 5, "Goals and Outcomes" was the most often chosen as the most important stimuli theme with 9 participants (37.5%). It was also the most popular theme when the secondary choices were counted. This theme however was not the most preferred secondary theme with only 4 people choosing it (16.67%).

Table 15 – Distribution of chains to stimuli themes and popularity of stimuli themes

Stimuli themes	Number of chains	Percentage of total chains	Percentage chose as primary	Times as primary stimuli	Percentage chose as secondary	Times as secondary stimuli	Total
1. Social Nature of Use	83	17,36%	16,67%	4	8,33%	2	6
2. Context of Use	55	11,51%	4,17%	1	33,33%	8	9
3. Construction of Identities	16	3,35%	4,17%	1	0,00%	0	1
4. Service Process Experience	87	18,20%	16,67%	4	20,83%	5	9
5. Goals and Outcomes	144	30,13%	37,50%	9	16,67%	4	13
6. Participation to Service Production	93	19,46%	20,83%	5	16,67%	4	9
Total	**478**			**24**		**23**	**47**

The second often theme number 6, ”Participation to Service Production” with 5 people (20.8 %) was chosen the most important stimuli theme. Together with secondary theme hits, this theme as a most significant theme with other themes (2 and 4) collecting in total 9 occurrences. Third most preferred primary themes were the theme number one ”Social Nature of Use”, and theme number 4 ”Service Process Experience” with 4 people (16.7%) choosing them as the most important themes. ”Context of Use”, collected 1 mentioning as primary theme. As for what were the most often chosen secondary themes, theme 2, ”Context of use” with 8 people assigning it (33.33%) and 4, ”Service Process Experience” with 5 people assigning it (20.83%). The theme number 3, ”Construction of Identity” collected only one hit as a primary theme and none as a secondary theme.

To make a weight analysis, the themes are compared to an average weight for one stimuli (16.7%). Amongst all stimuli themes, number 1 and 4 were slightly overweighed, and themes 5, and 6 significantly overweighed compared. Stimuli theme number 2 was slightly underweighted (yet it was surprisingly popular as secondary stimuli theme). Theme number 3 was significantly underweighted compared to other stimulus (in both as a primary and a secondary theme).

7.2 Stimuli distribution based of each feature clusters

In this paragraph the data distribution on feature clusters is being clarified. The question is, what stimuli themes contributed most on each feature clusters. This chapter is to give an in-depth view, what features were most commonly suggested in interview discussion taken under each stimuli themes. This may provide some evidence on how the participants associated each theme concerning the concrete feature suggestions related to them. In order to make any implications concerning how feature clusters were weighted within each stimuli themes, the distribution shares are being compared to *percentage of total chains* value from above Table 15. The clusters are being reviewed in popularity order.

The largest single feature cluster, *CCC - Find information,* comprises of all those information attributes related to each finds documented (see below Table 16).

Table 16 – Distribution of features of CCC cluster on stimuli themes							
A1 Attribute / Feature name	**St 1**	**St 2**	**St 3**	**St 4**	**St 5**	**St 6**	**Σ**
Photos: the find	4	1	1	5	7	5	23
Context and find spot information	2	1	1		10		14
Location information: either exact and/or non-exact	4			3	3	4	14
Find information	3			3	4	1	11
Find information: Age and era of the find	4		1	3	3		11
Find classes and categories (ontology)		2	1	1	3	3	10
Tags to other similar reference finds				1	4	5	10
Find information: The story and folkore of the find	2			2	3	2	9
Current legal status and location	3				5		8
Location information: has to be exact	5				2	1	8
Find information: The material of the find	1		1	1	3	1	7
Find information: The name of the find	3			1	3		7
Find information: Depth of the find	1				3	2	6
Find information: Find date and time	3			1	2		6
Location information: has to be non-exact	2		1	1	1	1	6
Discovery method and equipment	3			1	1		5
Find information: Description of the find	1	1		1	2		5
Find information: Size and dimensions of the find				2	2	1	5
Find information: Weight of the find				1	3	1	5
Find information: Altitiude from sea level	2				1		3
Find information: Decoration or text		1			2		3
Find information: Shape of the find	1		1	1			3
Location information: other			2		1		3
Photos: the finding place	1			1		1	3
Find information: Find weather and other conditions	1				1		2
Find information: Other notions / comments					2		2
Find information: Terrain and landscape type					1	1	2
Find information: Color of the find					1		1
Find information: Condition of the find	1						1
Find information: Craft method or technique					1		1
Find information: Find report (what happened)					1		1
Find information: Number of parts					1		1
Find information: Quality of surface					1		1
Find information: Unique find ID code or number				1			1
Research history of the find					1		1
In total	**47**	**6**	**9**	**30**	**78**	**29**	**199**
Percentage	**23,62%**	**3,02%**	**4,52%**	**15,08%**	**39,20%**	**14,57%**	

The features within cluster CCC were mentioned in total 199 times (1.). Within this cluster, 39.20% of all features were suggested within theme 5. The second most significant theme to produce these features was theme 1 (23.62%). In this cluster especially theme 5, but also theme 1, were weighted more than standard distribution would suggest. Themes 2, 3, 4 and 6 underachieved compared to their standard distributions.

The second largest feature cluster regarded as, *DDD - Identification of finds,* accompanied of all features related to identification tools (see below Table 17).

Table 17 – Distribution of features of DDD cluster on stimuli themes							
A1 Attribute / Feature name	St 1	St 2	St 3	St 4	St 5	St 6	Σ
Museum, professional or admin level identification and validation	3	2		4	7	8	24
Find identifying mechanism: community helps in identifying	2	3		6	6	3	20
Identification room and separate section for unidentified finds	6			2	1	7	16
Method and references behind identification (transparency)		1		4	1	5	11
Identification levels						9	9
Identification evaluation by rating / voting	3			1	2		6
Group or jury based identification	2					3	5
Hobbyist (low) level identification				1	1	3	5
Request for identification		1		2	2		5
The name of the identifier				1	1	2	4
History of information					3		3
Identification courses					1		1
List of identificators in the community						1	1
In total	16	7	0	21	25	41	110
Percentage	14,55%	6,36%	0,00%	19,09%	22,73%	37,27%	

This cluster DDD was mentioned in total 110 times (2). 37.27% of all feature ideas were collected in theme 6. Also theme 4 (19.09%) produced more features of this cluster, as average chain distribution. Other themes underachieved in this cluster to the average distributions.

The third largest feature cluster, namely *FFF - User information, security and content sharing settings,* was accompanied from all features related to user person information or user created information (see below Table 18). The features aggregated in this cluster gained 98 mentioning (3.). Stimuli theme 6 (31.63%) contributed highest portion of all features in this cluster. Theme 6 and 2 (13.27%) were more weighted than average chain distribution suggest. Especially theme 5 and 3 underachieved.

Table 18 – Distribution of features of FFF cluster on stimuli themes							
A1 Attribute / Feature name	St 1	St 2	St 3	St 4	St 5	St 6	Σ
Setup of hobbyists profile; interests, region, style, etc.	6			1	5	11	23
Adjusting content sharing and privacy settings	7	5		3	3	2	20
Roles		3		5	2	1	11
Identification: using alias (anonymity)		1		3	1	4	9
Limited access to sensitive information (depending roles)	2	1		1	1	3	8
Identification: using a real identity	1	1		3	1	1	7
Identification: using either alias or real name				2	3	1	6
Showing up your own collection					2	4	6
Registration				1	1	1	3
Registration: identificator						3	3
Professional role		2					2
In total	16	13	0	19	19	31	98
Percentage	16,33%	13,27%	0,00%	19,39%	19,39%	31,63%	

The fourth largest feature cluster, *HHH – Searching and information retrieval,* includes all features of searching information (see below Table 19).

Table 19 – Distribution of features of HHH cluster on stimuli themes

A1 Attribute / Feature name	St 1	St 2	St 3	St 4	St 5	St 6	Σ
Search and sort tool for finds and other content	3	1		4	8	2	18
Geographical search: place name or map based search	1			4	6	3	14
Advanced search function with combination searches	2			3	3	3	11
Category search	2	1		3	3	2	11
Free word, keyword and term-based search				4	3	1	8
Timing/age/era -based search	1			1	3	3	8
Easy-to-use hobbyist search	1			2	1	1	5
Image search	1			1	2	1	5
Representing lots of results at once				2	1	1	4
Represent results with images	1			1	1		3
Instructive search process with pre-defined checkboxes and search criterias				1	1		2
Material-based search				1		1	2
Searching other hobbyists				1		1	2
Sort resulting data by attributes	1					1	2
Manufacturer-based search						1	1
Search based on the ruler						1	1
In total	13	2	0	28	32	22	97
Percentage	13,40%	2,06%	0,00%	28,87%	32,99%	22,68%	

This feature cluster HHH collected 97 mentioning in total (4.). Themes 4, (28.87%), 5, (32.99%) and 6, (22.68%) produced the most of all features within this cluster. Those themes also overachieved and the rest of the themes were less weighted compared to average chain distributions

The fifth largest feature cluster *AAA – Usability, guidance and content representation* was aggregated of 23 features related to topics of usability, guidance and way the content is represented in the find database (see below Table 20).

Table 20 – Distribution of features of AAA cluster on stimuli themes							
A1 Attribute / Feature name	St 1	St 2	St 3	St 4	St 5	St 6	Σ
Giving guidance in different matters			1	7	1	4	13
Represent the finds on the map	1	1		3	3	3	11
Overall ease of use or usability	1	2		4	2	1	10
Links to external sources	2			1	3	2	8
Open for everyone	2	1		1	1	1	6
Links to publications and papers					4	1	5
Represent the newest finds at frontpage	1		1	1	2		5
Frequently asked questions					2	2	4
Personal home page view showing relevant collective content					3		3
Represent prohibited places at the map				1	2		3
Representing best find of each category				1		2	3
Symbols		2			1		3
Universal coding language and compatible platform		2		1			3
Fast database				1		1	2
Intuitive (non-scientific) structure, menu and classifications				2			2
Management of categories					2		2
Possibility to share other interesting contents					2		2
Recommendations				1		1	2
Representing information of research projects					2		2
Banning trolls					1		1
Code of ethics, terms & conditions, mission & vision					1		1
Complete and widely used database				1			1
Each find represented in own page	1						1
In total	8	8	2	25	32	18	93
Percentage	8,60%	8,60%	2,15%	26,88%	34,41%	19,35%	

In total the attributes in cluster AAA had 93 occurrences (5.). The greatest portion of these ideas was assigned in the stimuli theme 5 with the share of 34.41% of all occurrences and within theme 4 with share of 26.88%. Those therefore were slightly over-weighted to the standard distribution. Around as same as average chain distribution performed theme 6 with portion of 19.35%. Other themes, 1 (8.60%), 2 (8.60%) and especially 3 (2.15%) performed little worse than average distribution suggest within this cluster.

The sixth largest feature cluster, namely *GGG - Communication,* consists of all kinds of communication features (see below Table 21).

Table 21 – Distribution of features of GGG cluster on stimuli themes

A1 Attribute / Feature name	St 1	St 2	St 3	St 4	St 5	St 6	Σ
Taking contact to other users (contact information & messages)			2	1	8	5	16
Discussion forum (for on-topic/off-topic)	3			1	4	4	12
Meetings	2		1			6	9
Receipt and update concerning own or other finds	2			1	1	5	9
Comments and dicussions on finds and images	2			1	2	2	7
Private messages to other hobbyists (alias)				1	2	4	7
Taking contact to museum and research people (by contact information & messages)		1	1	2	1	1	6
Missing finds section and reports				1		4	5
Detection calendar	4						4
Calendar and event announcements			1		1		2
Contact information & taking contact to museum folks: automatic updates						2	2
News section					1	1	2
Reminders and reports from admin						2	2
Contacting home associations, museums and unions			1				1
Group-based messaging						1	1
Hobbyists as guides			1				1
Inventories with hobbyists			1				1
Section for field events		1					1
In total	13	2	8	8	20	37	88
Percentage	14,77%	2,27%	9,09%	9,09%	22,73%	42,05%	

This GGG cluster collected 88 mentioning (6.). Theme 6, (4205%) contributed most as a single theme to this cluster. Other themes but number 3 (9.09%) were less weighted in this cluster compared to average chain distribution values.

The seventh largest cluster *BBB – Find registration,* includes desired features of adding finds to the database and editing finds afterwards (see below Table 22).

Table 22 – Distribution of features of BBB cluster on stimuli themes

A1 Attribute / Feature name	St 1	St 2	St 3	St 4	St 5	St 6	Σ
Instructive process: easy enclosure of information with pre-defined options	2	3		7	1	1	14
Adding a new find to the system	2			5	2	4	13
Declaring finds to NBA		1			4		5
Adding & editing find information afterwards	2	1		1			4
Adding only a photo to the database (easy add)	1	1				1	3
Choosing a location of find from map	2			1			3
Declaration form				2		1	3
Landowner's permission	1				1	1	3
Export information from database					1		1
Removing finds					1		1
In total	10	6	0	16	10	8	50
Percentage	20,00%	12,00%	0,00%	32,00%	20,00%	16,00%	

The features in cluster BBB were mentioned total of 50 times (7.). As for the stimuli distribution, the theme 4 dominated with share of 32.00% of all occurrences being assigned within it. Second largest themes were themes 1, and 5 with 20.00% portion. Themes 6 (16.00%) and 2 (12.00%) followed. As compared to average chain distribution value, theme 4 and theme 1 performed better, and themes 5 and 6 performed worse.

The eight largest feature cluster, *MMM - Mobile version*, incorporates all mobile version related features (see below Table 23).

Table 23 – Distribution of features of MMM cluster on stimuli themes

A1 Attribute / Feature name	St 1	St 2	St 3	St 4	St 5	St 6	Σ
Easy and simple mobile version	1	6			1		8
Instructive process: easy enclosure of information with pre-defined options		5					5
Location information: either exact and/or non-exact					3		3
Photo of the find		2			1		3
Represent prohibited places at the map		2		1			3
Taking notes		2			1		3
Context and find spot information		2					2
Photos of finding place		2					2
Request for identification		2					2
Depth of the find		1					1
Exporting data from mobile to computer		1					1
Other notions from find place		1					1
Present search results with images		1					1
Receipt and update concerning own or other finds		1					1
Recording comments		1					1
Represent the finds on the map		1					1
Route tracking function					1		1
Smart glasses		1					1
Soil type		1					1
Version for field laptop		1					1
In total	1	33	0	1	7	0	42
Percentage	2,38%	78,57%	0,00%	2,38%	16,67%	0,00%	

This cluster MMM was mentioned 42 times (8.). Majority (78.57%) of all mobility related features were assigned through discussions held under theme 2. Theme 2 therefore was extremely over weighted as to mobile features cluster compared to other clusters. Other themes were significantly less weighted. Notably is that no any mobile version related themes were discussed under the themes 3 and 6. The themes significantly less produced ideas to this cluster than in any other clusters.

The smallest and ninth feature clusters, namely *JJJ - Incentives and rewards,* pertaining to all incentive and reward features (see below Table 24).

Table 24 – Distribution of features of JJJ cluster on stimuli themes

A1 Attribute / Feature name	St 1	St 2	St 3	St 4	St 5	St 6	Σ
Additional titles	7	1		1			9
Digital diplomas	4		1				5
Function for giving thanks and honor	1				2	2	5
Community acknowledgements	3						3
Exhibitions of finds			2				2
Licenses (driver's licence)			2				2
Selecting winners				2			2
Competence stats	1						1
Game characters	1						1
Identificator's certificate					1		1
Leaderboard of hobbyists				1			1
The identificator of the month				1			1
The picture of the month				1			1
In total	17	1	5	6	3	2	34
Percentage	50,00%	2,94%	14,71%	17,65%	8,82%	5,88%	

This cluster JJJ collected in total 34 mentioning (9.). The most important single theme contributing to this feature cluster was theme 1, (50.00%), once half of all features were suggested in this theme. Theme 3 (14.71%) also generated surprisingly well to this cluster. Therefore themes 1 and 3 were significantly more weighted than what could be expected from average chain distribution values. Other stimuli themes were either weighted moderately or significantly below the average distributions.

7.3 Stimuli distributions on each consequence bundle

In this chapter the aggregated 11 consequence bundles are being discussed in terms of their stimuli distribution as well.

The largest consequence bundle namely *Task efficiency* is constituted of all consequences, which somehow relates to performing task efficiently (see below Table 25).

Table 25 – Distribution of consequences of TASK EFFCICIENCY on stimuli themes							
Consequence name	**St 1**	**St 2**	**St 3**	**St 4**	**St 5**	**St 6**	**Σ**
Faster and trustworthy identification of find	11	8		11	16	16	**62**
Save time and efforts and help completing tasks faster and more efficiently	6	5		5	12	6	**34**
Can compare own finds with other finds (reference finds)	2	3		8	9	4	**26**
Can assess the value and importance of the find for itself and for research	5	3			9	4	**21**
Finding good new detecting sites	6	3		4	2	6	**21**
Finding the story of the find: reason why it ended up there and where it has belonged to	4	2			9	1	**16**
Can assess the distribution and prevalence of finds	2	1		1	8	3	**15**
Age of the find is determined	3			2	6	1	**12**
Utilization of all available competences in the community		1		1	3	4	**9**
Help remembering the trip and the information	1	3			2	1	**7**
Help planning and conduction inventions	2	1	1	1	2		**7**
Can check out the find with your own eyes					5	1	**6**
Makes hobby or working day easier	2	1		1	1		**5**
Updating other official databases and registries			1		1	2	**4**
Statistical analysis of the data	1	1			1	1	**4**
Classifications and types of finds are determined				2	2		**4**
Precise scanning of areas	1	1				1	**3**
Can touch history by your own hand				1	1		**2**
Enable selling metal detectors	1						**1**
In total	**47**	**33**	**2**	**37**	**89**	**51**	**259**
Percentage	**18,15%**	**12,74%**	**0,77%**	**14,29%**	**34,36%**	**19,69%**	

Concerning consequences of this cluster, task was defined either hobbyist-based or professional task. Typical hobbyists task is for example ”Finding good detecting site” with 21 hits, and typical professional task is ”Help planning and conducting inventions” with 7 hits. This consequence bundle was substantially the largest consequence category with in total 259 hits (1.). In ”Task efficiency” consequence bundle, the stimuli 5, (34.36%) was the most popular theme in which these consequences were assigned.

The second largest consequence bundle labelled as *Sociality* were comprised of social consequences, such as ”Can take contact to other user” with 27 hits, ”Can make friends...” with 19 hits and so forth. (See below Table 26).

Table 26 – Distribution of consequences of SOCIALITY on stimuli themes							
Consequence name	**St 1**	**St 2**	**St 3**	**St 4**	**St 5**	**St 6**	**Σ**
Can take contact to other users	4	1	3	4	6	9	**27**
Can make friends find people with similar interests and build social relationships	3	1	2		5	8	**19**
Get help, such as hints, answers, assistance and technical support	8	3		1	5	2	**19**
Cooperation and information sharing between hobbyists and professionals		3	1	1	6	4	**15**
Trustworthiness, noteworthiness and authenticity of persons can be assessed	5	3			3	2	**13**
Can get to know and identify other users better	1			1	4	4	**10**
Can find users with certain skills and competences	3	2		1	2	2	**10**
People can share experiences, moments, and opinions with other people	3	3			1	2	**9**
Helping others and sharing competences and other things	1	2	1	1	2	2	**9**
Increase mutual understanding between parties	3		1		4		**8**
Can arrange gatherings and meet other people	4		2			1	**7**
Getting more and faster feedback	1		1		1	2	**5**
Group building and doing together	3				1		**4**
Getting new ideas and viewpoints	3			1			**4**
In total	**42**	**18**	**11**	**10**	**40**	**38**	**159**
Percentage	**26,42%**	**11,32%**	**6,92%**	**6,29%**	**25,16%**	**23,90%**	

The consequences in this bundle were mentioned 159 times in total (2.). This consequence bundle was most often associated to the features assigned in the theme 1, with 42 hits (26.42%).

The third largest consequence bundle is labelled as *History research.* The consequences aggregated within this cluster pertained to contribution toward history research and protection of historical information, as well as other related (see below Table 27).

Table 27 – Distribution of consequences of HISTORY RESEARCH on stimuli themes							
Consequence name	**St 1**	**St 2**	**St 3**	**St 4**	**St 5**	**St 6**	**Σ**
NBA and museums gain benefits: new research projects, new excavations and fixed relic sites	7	4	3		11	2	27
Protect the find, the site and the context	1	5	2	1	4	6	19
Multiple parties are beneficiaries such as exhibitors, students, teachers, and other	4	2	3	3	4	1	17
Research of local history gain benefits	4	2		3	1	1	11
More fixed relics is found					4	2	6
Increase the value of the find	2				2	1	5
Increase awareness of historical, cultural and material heritage			1	1	2		4
Research and researchers gain benefits		3	3	3	17	3	29
In total	**18**	**16**	**12**	**11**	**45**	**16**	**118**
Percentage	**15,25%**	**13,56%**	**10,17%**	**9,32%**	**38,14%**	**13,56%**	

All consequences within this bundle generated in total 118 hits (3.). It consist of all consequence elements, which are somehow linked to making any contribution to the history research; supporting NBA and museums in their work, protecting information, finds and heritage, and so on. The three most often mentioned consequences were: ”NBA and museums will gain benefit...” with 27 hits, ”Protect the site and the find” with 19 hits, and ”Multiple parties are beneficiaries.” with 17 hits, just to name a few. The majority of all consequences of this bundle were recorded in the stimuli 5, (38.14%).

The fourth largest consequence bundle is *Quality of information,* with consequences referring to increased quality, credibility, consistency, and readability, to name a few (see below Table 28).

Table 28 – Distribution of consequences of QUALITY OF INFORMATION on stimuli themes

Consequence name	St 1	St 2	St 3	St 4	St 5	St 6	Σ
Quality of information gets better: faster, up-to-date, complete, consistent, coherent, authentic, trustworthy, correct and precise information	5	6		12	6	8	37
Enhanced search results: easier, faster, more precise, more visual, more correct and more specified search results for each users' needs	5	2		10	11	5	33
Increase credibility of the information: authenticity, trustworthiness, transparency of information	3		1	6	13	6	29
Correct and consistent terminology of the find is used	1	1	1	2	1	2	8
In total	**14**	**9**	**2**	**30**	**31**	**21**	**107**
Percentage	**13,08%**	**8,41%**	**1,87%**	**28,04%**	**28,97%**	**19,63%**	

All consequences in this bundle generated in total 107 hits (4.). The largest single consequence was ”Quality of information gets better...” with 37 hits. This bundle was most often discussed in theme 5, (28.97%) and theme 4, (28.04%).

The fifth largest consequence bundle (see below Table 29) was labelled as *Self-esteem.* All consequences in this bundle together contributed 80 hits (5.).

Table 29 – Distribution of consequences of SELF-ESTEEM on stimuli themes

Consequence name	St 1	St 2	St 3	St 4	St 5	St 6	Σ
Increase motivation commitment and enthusiasm to participate: sense of community and sense togetherness	5	3	4	8	5	10	35
Feeling meaningful by gaining social and self-reward, being thanked, noticed, being appreciated and recognized, praised up, gaining honor and being identified	8	3	5	4	3	5	28
Learning, improving skills, and gaining competences	5		1	4	2	1	13
Respecting, appreciating and taking hobbyists opinions into account				1	3		4
In total	**18**	**6**	**10**	**17**	**13**	**16**	**80**
Percentage	**22,50%**	**7,50%**	**12,50%**	**21,25%**	**16,25%**	**20,00%**	

The bundle was combined of self-esteem, feeling capability, and motivation related consequences, such as ”Increase motivation...” with 35 hits, ”Feeling meaningful...” with 28 hits, and “Learning” with 13 hits. As for stimuli theme distribution, this bundle was often mentioned in themes 1, (22.50%) 3, (12.50%) and 4, (21.25%).

The sixth largest consequence bundle, *Quantity of information,* was constituted of outcomes linked to quantity of information (see below Table 30).

Table 30 – Distribution of consequences of the QUANTITY OF INFORMATION on stimuli themes

Consequence name	St 1	St 2	St 3	St 4	St 5	St 6	Σ
More finds and information is being documented	4	5	1	8	5	8	31
Getting more information	6	1		5	7	3	22
Getting more information out of the find and context	1	2	2	3	6		14
Accumulation of information into one storage place	3	1			4	2	10
In total	**14**	**9**	**3**	**16**	**22**	**13**	**77**
Percentage	**18,18%**	**11,69%**	**3,90%**	**20,78%**	**28,57%**	**16,88%**	

The most often mentioned consequence category was ″More finds and information is being documented″ with 31 hits. All categories contributed totally 77 hits. (6.) Most often this bundle was linked to stimuli themes 5, (28.57%) and 4 (20.78%). Features suggested in these stimuli themes would most often produce these consequences.

The seventh largest consequence bundle was labelled as *Credibility*, which consist of the consequences linked to trustworthiness and credibility of the database and the activity (see Table 31).

Table 31 – Distribution of consequences of the CREDIBILITY on stimuli themes

Consequence name	St 1	St 2	St 3	St 4	St 5	St 6	Σ
Database become convincing credibile and honest		1	2	10	6	6	25
Law-abiding and responsible behavior: people are complying with code of ethics, rules, and legislation		3	2	2	5		12
Abuse and other misbehavior is decreased or avoided			1	2	4	3	10
Attendance of researchers/professionals				1	1	1	3
Openess and transparency	1			1		1	3
Increase enlightement and awareness amongst hobbyists			1		2		3
Internationalization of activity					1		1
In total	**1**	**4**	**6**	**16**	**19**	**11**	**57**
Percentage	**1,75%**	**7,02%**	**10,53%**	**28,07%**	**33,33%**	**19,30%**	

This bundle included consequences such as: ″Database become convincing″ with 25 hits, ″Law-abiding and responsible behavior″ with 12 hits and ″Abuse and other misbehaviour is decreased or avoided″ with 10 hits. Together with the rest of the consequence categories, these combined 57 hits (7.). Stimuli themes 4, (28.07%), and 5 (33.33%) produced most of these consequences.

The eight largest consequence bundle regarded as *Experience* include the consequences related to positive experiences, such as ″Usability and Ease-of-use″ with 25 hits (see below Table 32).

Table 32 – Distribution of consequences of the CREDIBILITY on stimuli themes

Consequence name	St 1	St 2	St 3	St 4	St 5	St 6	Σ
Better usability and ease-of-use	3		1	8	9	4	25
Pleasing and playful experience and entertainment	2			3		1	6
Access to the database and availability and retrieval of information	1	3		2			6
Flow-state (concentration and relaxation) appears		2		1			3
In total	**6**	**5**	**1**	**14**	**9**	**5**	**40**
Percentage	**15,00%**	**12,50%**	**2,50%**	**35,00%**	**22,50%**	**12,50%**	

These all categories generated 40 hits (8.) Most often the features suggested on discussions under theme 4, (35.00%) produced these consequences. Especially the ″Usability and ease-of-use″ is linked to that stimuli theme.

The ninth largest consequence bundle was *Quantity of members* with such a consequences included as: ″The number of active contributors increase″, with 12 hits, ″Increase interest toward history research″ with 5 hits and ″Increase interest toward hobby″ with 5 hits (see below Table 33).

Table 33 – Distribution of consequences of the QUANTITY OF MEMBERS on stimuli themes							
Consequence name	**St 1**	**St 2**	**St 3**	**St 4**	**St 5**	**St 6**	**Σ**
The number of active contributors increase	1	2		4	1	4	12
Increase interest toward history research			1		4		5
Increase interest toward hobby	2			1	1	1	5
In total	**3**	**2**	**1**	**5**	**6**	**5**	**22**
Percentage	**13,64%**	**9,09%**	**4,55%**	**22,73%**	**27,27%**	**22,73%**	

In total these consequences collected 22 hits (9.) The features assigned in themes 4, (22.73%) 5, (27.27%) and 6, (22.73%) most often were associated to these outcomes.

The tenth largest consequence bundle was named as *Trust & Security*. This bundle included the consequences linked to person's experience of trust and safety of using the system (see below Table 34).

Table 34 – Distribution of consequences of the TRUST & SECURITY on stimuli themes							
Consequence name	**St 1**	**St 2**	**St 3**	**St 4**	**St 5**	**St 6**	**Σ**
System respect user's freedom and rights: protecting information, privacy, private use of the system	3	2		2	5		12
Increase trust and remove fears concerning activity and the system		1		2	6	1	10
In total	**3**	**3**	**0**	**4**	**11**	**1**	**22**
Percentage	**13,64%**	**13,64%**	**0,00%**	**18,18%**	**50,00%**	**4,55%**	

The consequence categories were ”System respect user's freedom and rights...” with 12 hits, and ”Increase trust and remove fears...” with 10 hits. In total this bundle generated 22 hits (10.) Most often, namely half of the all occurrences of these consequences, were mentioned in stimuli themes 5, (50.00%)

The final and eleventh consequence bundle regarded as *Other benefits* included two consequences, which related to extrinsic goals (see below Table 35). These were: “Can get money” with 1 hit and “Physical fit gets better” with 1 hit. These were mentioned in themes 5, (50.00%) and 6, (50.00%).

Table 35 – Distribution of consequences of the OTHER BENEFITS on stimuli themes							
Consequence name	**St 1**	**St 2**	**St 3**	**St 4**	**St 5**	**St 6**	**Σ**
Can get money					1		1
Physical fit gets better						1	1
In total	**0**	**0**	**0**	**0**	**1**	**1**	**2**
Percentage	**0,00%**	**0,00%**	**0,00%**	**0,00%**	**50,00%**	**50,00%**	

7.4 Value bundles and distribution to the stimuli themes

In this chapter the values bundles are being discussed in terms of their stimuli distribution. This paragraph concerns the question of what stimuli themes were interrelated to each value bundle. This may help inferring implications of how stimuli themes were interpreted by participants and what values were linked to these stimuli themes by the participants.

The largest value bundle was regarded as *History research* (see below Table 36).

Table 36 – Distribution of values of HISTORY RESEARCH on stimuli themes

Value name	St 1	St 2	St 3	St 4	St 5	St 6	Σ
History and archaeology research	15	14	5	5	36	14	89
Preservation of historical information, material and cultural heritage	3	9	5	2	6	7	32
Research of local history	5	6	2	3	7	2	25
Interest in history and historical finds	2			2	9	6	19
History awareness	2	3		1	7	2	15
Love and pride related to home place	1		1			2	4
Research of family history					1		1
In total	28	32	13	13	66	33	185
Percentage	**15,14%**	**17,30%**	**7,03%**	**7,03%**	**35,68%**	**17,84%**	

This bundle was constituted by the most often mentioned single value category such as ”History and archaeology research” with 89 hits, ”Preservation of historical information...” with 32 hits, and ”Research of local history” with 25 hits. Together with the rest value categories, this bundle collected in total 181 hits (1.). As for the stimuli theme distribution, the theme 5, (35.68%) clearly dominated other themes.

The second largest value category bundle, namely *Self-esteem and learning* comprised of value categories linked to self-esteem, thirst for information, learning and other intrinsic values (see below Table 37).

Table 37 – Distribution of values of SELF-ESTEEM & LEARNING on stimuli themes

Value name	1	2	3	4	5	6	Σ
Thirst for information	5	7	2	7	11	11	43
Respect, appreciation, encouragement and recognition	10		2	5	5	5	27
Learning, understanding, self-cultivation and civilisation	4	3		9	6	3	25
Interest and curiosity	8			4	7	3	22
Self-esteem and feeling of mastery, capability and competent	2		2	6	4	4	18
Participation	5	2		2		6	15
Meaningfulness	1	1			1	8	11
Independcy, autonomy and freedom				2	1	1	4
Solving problems and mysteries, building puzzles	2				1	1	4
Power						1	1
In total	37	13	6	35	36	43	170
Percentage	**21,76%**	**7,65%**	**3,53%**	**20,59%**	**21,18%**	**25,29%**	

These consequences were for example: ”Thirst for information” with 43 hits, ”Respect, appreciation, encouragement and recognition” with 27 hits, and ”Learning, understanding, self-cultivating and civilization” with 25 hits were included. Together with the rest of the value categories, these three value

categories generated in total 170 hits (2.). Stimuli theme 6 dominated (25.29%), themes 1 (21.76%), 5 (21.18%) and 4 (20.59%) followed.

The third largest value bundle *Sociality and status* constituted by following value categories: ”Social relationships and identification” with 43 hits, ”Helping others” with 15 hits, ”Cooperation and teamwork” with 15 hits, ”Showing off” with 7 hits, ”Gaining honour and status” with 7 hits, and finally ”Competition” with 4 hits (see below Table 38).

Table 38 – Distribution of values of SOCIALITY & STATUS on stimuli themes

Value name	1	2	3	4	5	6	Σ
Social relationships and identification	5	4	4	3	11	16	43
Cooperation and teamwork	3	3	1	2	3	3	15
Helping others and sharing things with them	2	1		3	3	6	15
Showing off	1			3		3	7
Gaining honor, status and being famous	1				3	3	7
Competition	1	1		1	1		4
In total	13	9	5	12	21	31	91
Percentage	**14,29%**	**9,89%**	**5,49%**	**13,19%**	**23,08%**	**34,07%**	

This value category bundle generated in total 91 hits (3.). Stimuli theme 6, (34.07%) dominated other stimuli themes.

The fourth most popular bundle, labelled as *Task efficiency* included three value categories: ”Identifications of finds” with 36 hits, ”Efficiency, effectiveness and working economy” with 24 hits, and ”Production of academic information” (see below Table 39).

Table 39 – Distribution of values of TASK EFFICIENCY on stimuli themes

Value name	1	2	3	4	5	6	Σ
Identification of finds	6	5		8	3	14	36
Efficiency, effectiveness and working economy	1	3		9	5	6	24
Production of academic information		1		1	13		15
In total	7	9	0	18	21	20	75
Percentage	**9,33%**	**12,00%**	**0,00%**	**24,00%**	**28,00%**	**26,67%**	

These three categories generated in total 75 hits (4.) as a bundle. The values pertaining to value categories in this bundle were often mentioned in themes 5, (28.00%), 6, (26.67%), and theme 4 (24.00%).

The fifth bundle was labelled as *Experience and enjoyment*. This bundle is constituted by all value categories pertaining to the subjective experiences, such as joy and pleasure of doing things for the sake of it (see Table 40).

Table 40 – Distribution of values of EXPERIENCE & ENJOYMENT on stimuli themes

Value name	**1**	**2**	**3**	**4**	**5**	**6**	Σ
User experience, usability and ease-of-use	4	3		10	10	4	31
Joy of finding and discovering things	1			6	4	2	13
Excitement and serendipity	3			4	1	3	11
Enjoyment, gratification and satisfaction		1		4	2	3	10
Visuality				1			1
In total	8	4	0	25	17	12	66
Percentage	**12,12%**	**6,06%**	**0,00%**	**37,88%**	**25,76%**	**18,18%**	

This value category bundle consisted of four values, namely ”User Experience” with 31 hits, ”Joy of finding and discovering things” with 13 hits, ”Excitement

and serendipity" with 11 hits, "Enjoyment, gratification and satisfaction" with 10 hits and "Visually" with 1 hit, which generated in total 66 hits (5.). The stimuli theme 4, (37.88%) dominated clearly over the other themes.

The sixth largest value bundle, labelled as *Credibility*, comprised the value categories related to credibility of activity, such as "Fairness, honesty and equality" with 24 hits, "Metal detecting hobby and development of it", with 14 hits, and "Complement and enforcement of law" with 11 hits (see below Table 41).

Table 41 – Distribution of values of CREDIBILITY on stimuli themes

Value name	1	2	3	4	5	6	Σ
Fairness, honesty and equality	5	4		7	8		24
Metal detecting hobby and development of it	2	1		4	5	2	14
Complement and enforcement of law and order	1	2		1	6	1	11
Transparency and openess		2			2	1	5
Advancement and improvement generally				2	1	1	4
In total	8	9	0	14	22	5	58
Percentage	**13,79%**	**15,52%**	**0,00%**	**24,14%**	**37,93%**	**8,62%**	

Together with the rest of the value categories, this bundle generated in total 58 hits (6.). Theme 5 (37.93%) significantly outperformed other themes.

The seventh value category bundle *Trust & Security,* was accompanied of the values related to trust and security, such as "Common trust..." with 24 hits, and "Privacy & legal protection" with 7 hits (see below Table 42). These together generated in total 31 hits (7.). Theme 5 dominated other themes (41.94%).

Table 42 – Distribution of values of TRUST & SECURITY on stimuli themes

Value name	1	2	3	4	5	6	Σ
Common trust, reliability, safety, and appropriateness	1	1		5	9	8	24
Privacy & legal protection		2		1	4		7
In total	1	3	0	6	13	8	31
Percentage	3,23%	9,68%	0,00%	19,35%	41,94%	25,81%	

The eight popular *Quality of information* bundle consist of the following value category: "Consistency, validity and quality of information" with 27 hits and therefore collecting in total 27 hits (8.) (See below Table 43). Theme 4, (33.33%) dominated and 2, (22.22%) followed.

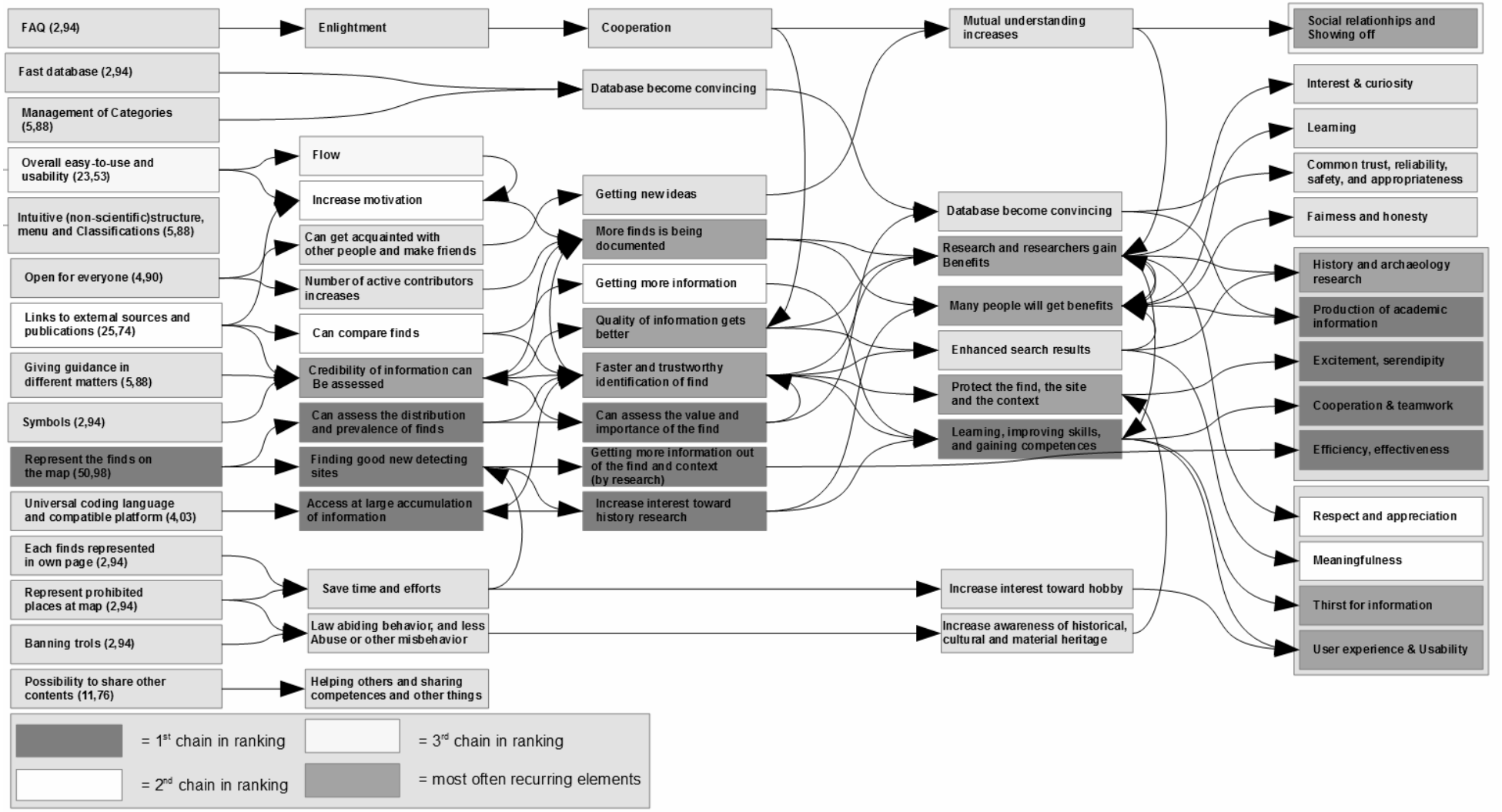
Table 43 – Distribution of values of QUALITY OF INFORMATION on stimuli themes

Value name	1	2	3	4	5	6	Σ
Consistency, validity and quality of information	2	6		9	6	4	27
In total	2	6	0	9	6	4	27
Percentage	**7,41%**	**22,22%**	**0,00%**	**33,33%**	**22,22%**	**14,81%**	

7.5 Network maps & Critical success chains

In this chapter the network maps are depicted and further discussed. First the network maps are represented. After each amp, each cluster will be reviewed following on the *features*, *consequences* and the *values*.

Figure 4 – Usability, guidance and content representantion (AAA)

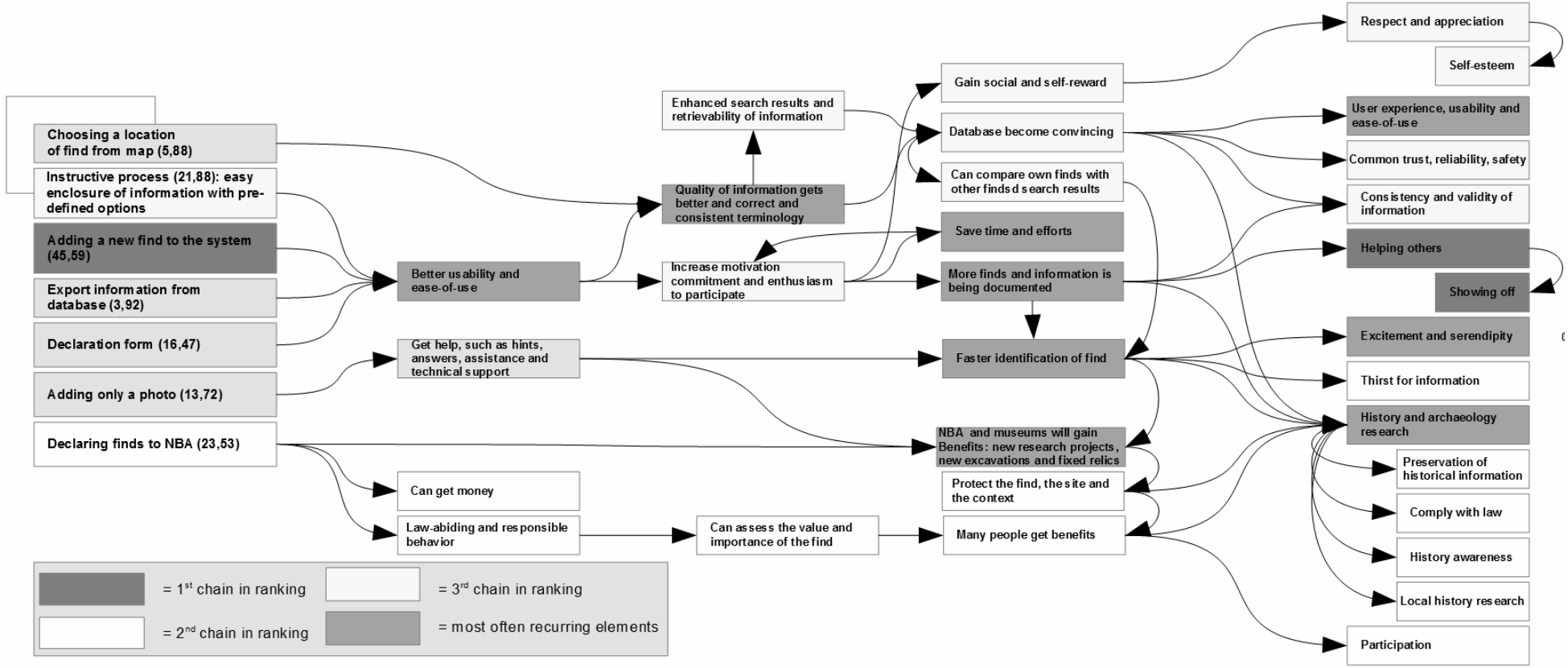


Features: Based on the ranking information, the three most popular features assigned in the AAA cluster were: ”Representing finds on the map” (50.98), ”Links to external sources and publications” (25.74), and ”Overall easy-to-use and usability” (23.53). One significant feature was ”Possibility to share other content” (11.76) (see above Figure 4).

Consequences: The subsequent consequences attributed to overall *easy-to-use* was the increased motivation and a flow state, which cause that more finds is being documented. This also contribute that the quality of information is improved, which leads to a faster and trustworthy identifications of finds. This again increases the quality and credibility of information, which lead to situation when database become again more convincing. This derives to benefits gained for research and researchers, as well as protection of historical information, sites and finds. The ultimate consequence here is that different people, researchers, students, teachers and other groups will gain benefits. As one participants stated, that the historical heritage belongs to everyone. These consequences were often linked to values, such as history and archaeology research, production of academic information and excitement. As for *links to external sources and publications* feature, the following consequences were reported: the motivation increase, and possibility to compare finds together in order to identify find were reported. Getting more information for the learning purposes was also mentioned. As for *representing finds on map* feature, it enables assessing geographical distribution of certain find and consequently assesses the value of the find in itself, and for research. Another benefit for doing so was possibility to find good detecting places. Another consequence from that feature was that the database is being perceived convincing, which is valuable in the meaning need for trust, reliability, safety and appropriateness.

Values: The most oftentimes mentioned values related to features listed above are as follows: history and archaeology research, thirst for information, user experience and social relationships. Essentially the most important single value in this cluster was the history and archaeology research. This feature mainly attributes back to overall ease-of-use. The second most often mentioned value was a general thirst for information and related willingness to improve self and learning new things. This value derives from quality internal contents and links to external contents. User experience and usability were third most often-mentioned value category. This also derives back to flow and usability as well as showing finds and other preferred contents at the front page. Other less popular value categories in this cluster were social relationships, quality and consistency of information, complying law, and general fairness, honesty and equality.

Figure 5 – Find registration (BBB)

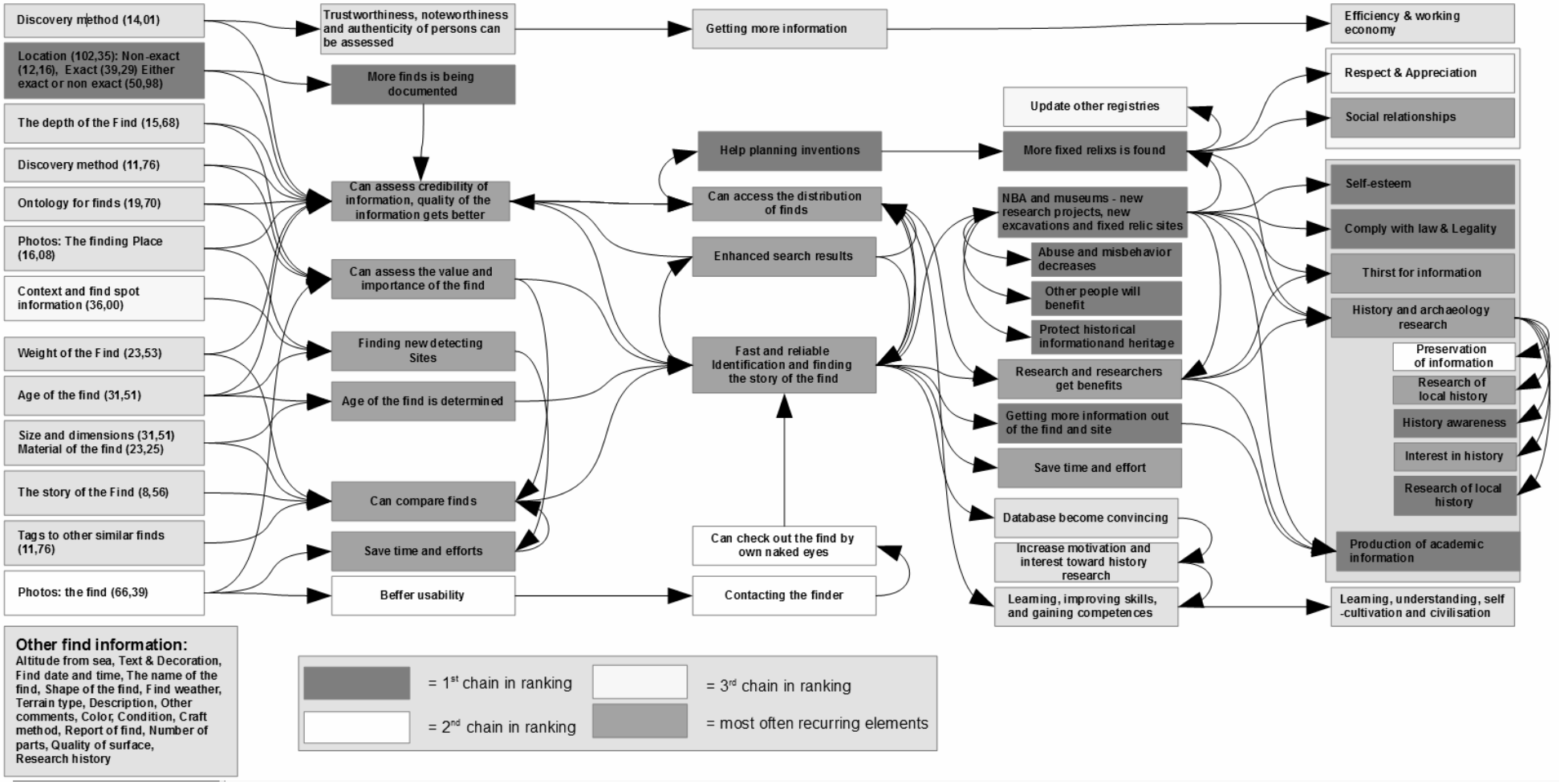


Features: The three highest ranked feature categories in this BBB cluster were: ”Adding a new find to the system” (45.59), ”Instructive process: easy enclosure of information with pre-defined options” (21,88), ”Declaring finds to NBA” (23.53) and ”Declaration form” (16.47). ”Adding only a photo” (13.72) was a significant one. It's not because people think that the finds should be primarily to be declared to NBA using find database system, but for they felt that as reporting finds to NBA is of importance generally (see above Figure 5).

Consequences: The consequences derived from *adding new find* feature, *instructive process* feature and *declaration form* feature were better usability and ease-of-use, which leads improved motivation. Furthermore, once the system is convenient to use, it results in more finds being documented and higher quality of information. This all saves time and efforts and help completing tasks. Ultimately that leads to faster identification of finds, as well as helping NBA and museums in their work. Consequences derived from *declaring finds to NBA* was that once done so, the activity is complying with law. The participants also believed that less misbehaviour and abuse appears, as well as examination the value of the finds will be possible. Ultimately this was seen having link to doing a favour to different types of user groups, such as scholars, students, teachers, and other groups.

Values: The two most often mentioned value categories behind the above consequences were user experience, usability and ease-of-use and history and archaeology research. Other values were excitement and serendipity, consistency of information and identification of finds. This indicates that the ultimate benefits for the participants in this category are at least dyadic; on the other hand they valued user experience for the sake of instant experience. Yet from another perspective they value the ultimate goal, which is to know more about history and to preserve valuable historical information.

Figure 6 – Find information (CCC)

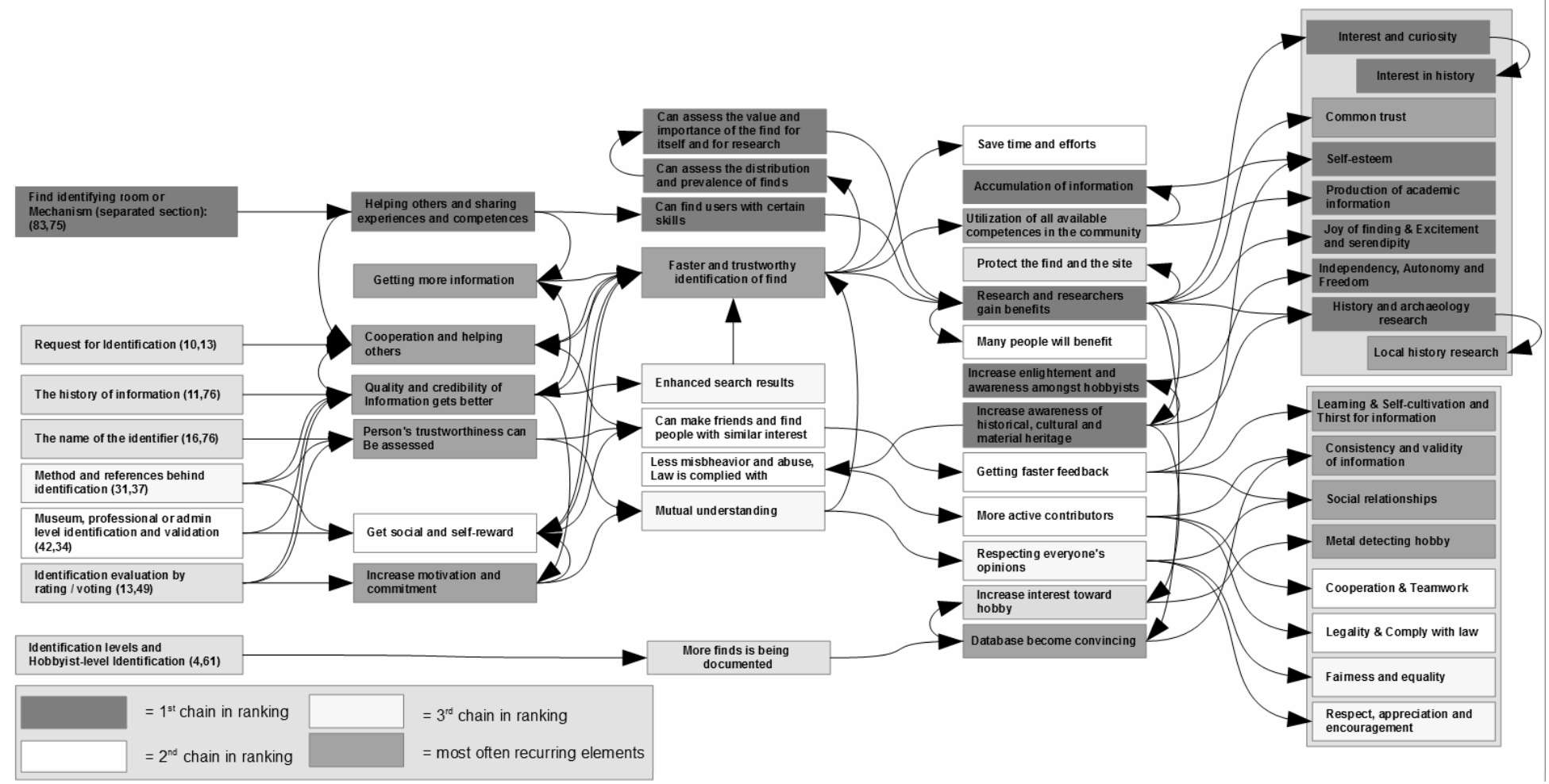


Features: The most favored features in CCC cluster were: *Location feature group* (102.35) accompanied of three distinct location related attributes (i.e. location has to be non-exact, location has to be either non-exact or exact and location hast to be exact) therefore have the highest ranking points of all features. As for location information, there were three kinds of feature statements; the largest group suggested that location information should be available, yet it should be up to the finder whether to publish exact or non-exact location. The second group thought that the location information should be precise. Third smallest group supported the idea of location information being recorded always as non-exact. *Photo of the find* (66.39) was ranked second in this cluster. Third one was *Context and find spot information* (36.00). Other highly ranked ones were *Size and dimensions of find* (31.51), *Age of the find* (31.51), *Weight of the find* (23.53), *Material of the find* (23.25), *Ontology for the find* (19.70) and *Photos of finding place* (16.08) (see above Figure 6).

Consequences: The consequence derived from accepting *non-exact location information* was that more finds is being documented. The cost of this to be that the quality of information suffer, which means no distribution of finds can be assessed and consequently no help for planning inventions are being achieved. *The photos of find* were the most important single attribute, as it enabled assessing the value of finds and consequently identification of finds. The photos also derived better usability, and possibility to contact other users to check the identity of find by own eyes. This all saves time and efforts and help completing task faster. Ultimately NBA, museum and researchers gain benefits, as new research projects were to begin to locate more fixed relics. This is also to support the protection of cultural heritage. *The contextual information* were considered as important as it enabled finding new detecting sites and therefore it saved time and efforts. Other significant consequences were learning and improving skills, contacting others

Values: Substantially the highest number of mentioning of all values in this cluster was assigned to interest in research of past and local history research. This value is common for both user groups, hobbyists and professional. This value was linked to the above-indicated consequences of benefiting NBA and museums and research and researchers. The identification of finds, though, was the ultimate value itself for many participants. However, many participants perceived it differently, only as a middle stage toward the final goal of unveiling historical secrets. Social relationships played also remarkable role; it was mentioned fourth most often as a value in this cluster, even though this cluster by no means focused on facilitating social interaction. Production of academic information was mentioned important values for those who had academic aspirations. Many people, yet minority, mentioned that feeling competent and self-esteemed was the ultimate value for them.

Figure 7 – Identification of the finds (DDD)

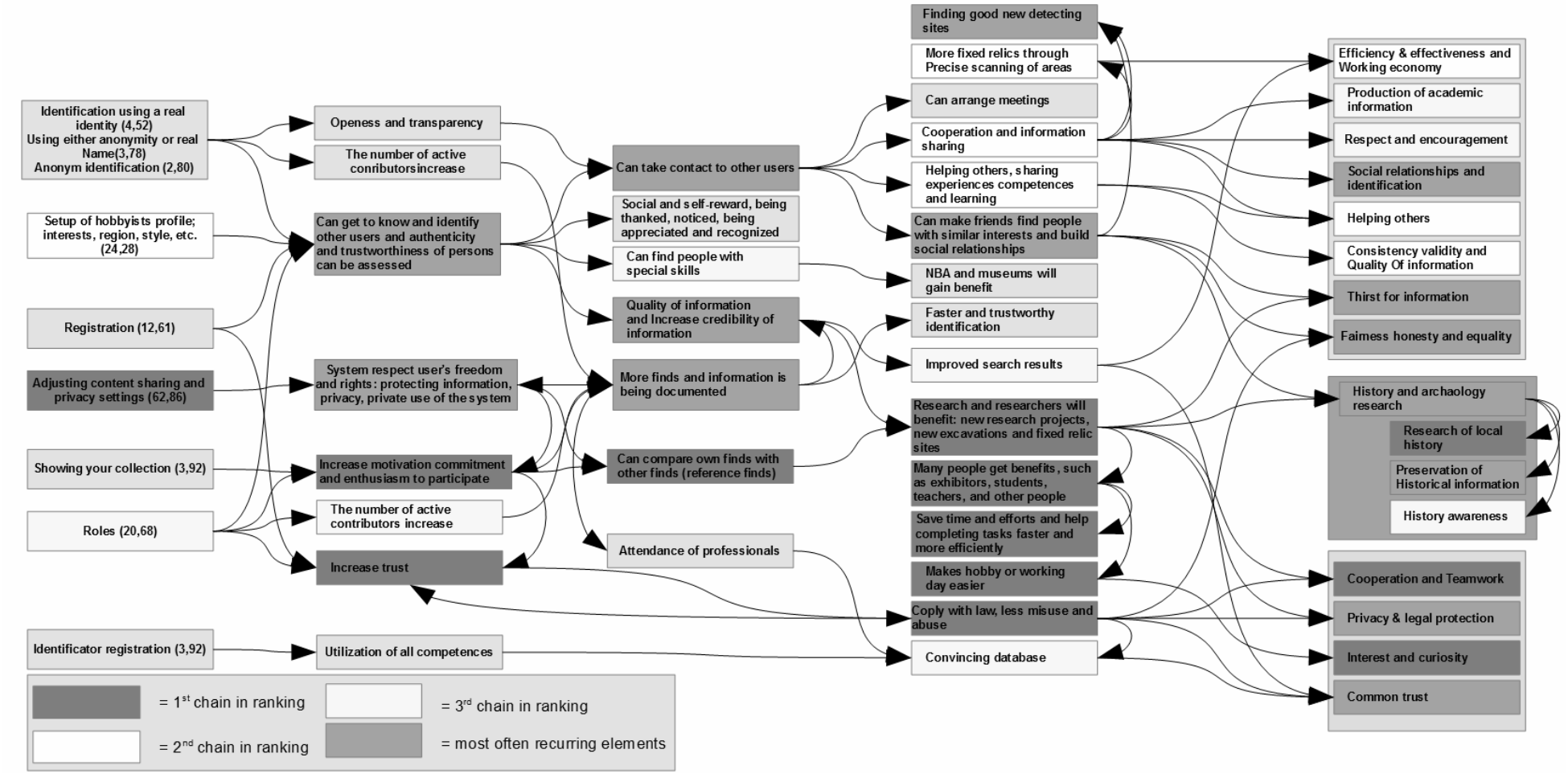


Features: *A find identification room or mechanism* (83.75) was the most often mentioned feature in this DDD cluster. In comparison to all features regardless of the cluster, it was ranked second highest. It combines two features, namely Find identifying mechanism (50.42) and Identification room (33.33). This feature refers to a mechanism, which incorporates the knowledge from the community members contributing toward identification of the finds. Furthermore, *The professional or expert level validation to the identifications* (42.34) was ranked second in this cluster. This pertains to the attendance of professional level persons from museum or NBA to validate the find information. Other less highly ranked features were a *Name of the identifier* (16.76), an *Identification evaluation by rating or voting* (13.49) which means to co-produce validity data allowing participants to vote whether the identification is trustworthy or not. Finally the *History of information* (11.76), *the Request for identification* (10.13), and *Representing certain identification levels for finds* (4.61) were also suggested (see above Figure 7).

Consequences: As to the consequences of the above mentioned *identification related features*; the focus was at identification of finds via increasing the credibility and quality of the information through cooperation. This end was in particular attributed back to *museum, professional or admin level identification tools*. For transparency, the participant was willing to be able to evaluate persons behind the identifications. *Find identification room or mechanism* offer a chance to help others and share experiences and competences and to find users with certain skills. Professionals, who were interested to use the system to find qualified hobbyists for their research projects, often mentioned the latter. Utilization of all competences in the community was seen important outcome, which help the database become more convincing and trustworthy and leads to even better accumulation of find information.

Values: The identification of finds takes priority over other values in this cluster. Yet, similarly as in CCC cluster, there are other values underlying this goal. The most important one was a history and local history research, consistency and quality of information and social relationships. Other values were common trust, reliability, safety and appropriateness. Learning and thirst of information is one of the minor value drivers too in this cluster.

Figure 8 – User information, security and content sharing (FFF)

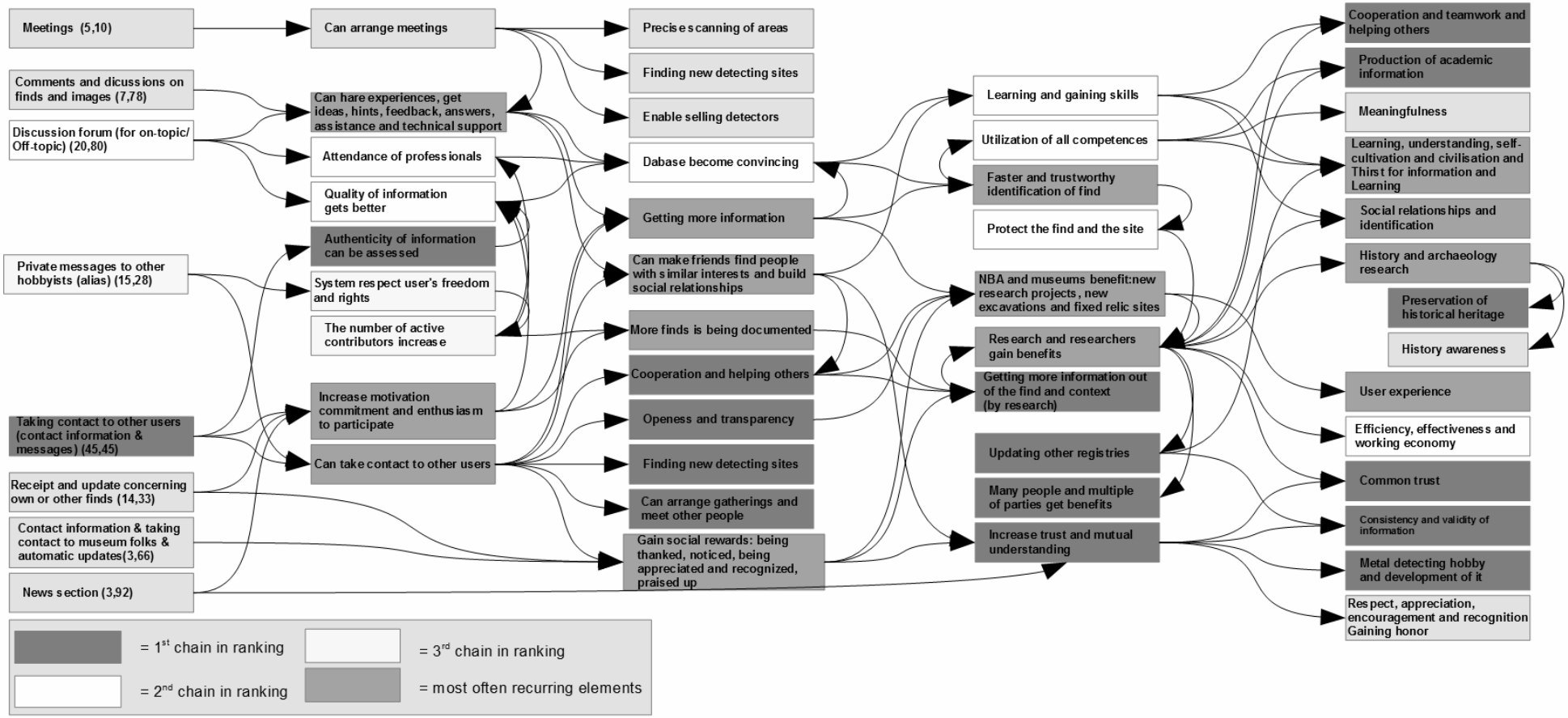


Features: The first three best-ranked features in cluster FFF were *Adjusting content sharing and privacy settings* (62.86), *Setup of hobbyist profile* (24.28) and *Roles* (20.68). Other important features were also, *Registration* (12.61), and *Showing up with real identity or as anonym* (combined of the three, 11.10) (see above Figure 8).

Consequences: Attributed consequences to *the privacy adjustment settings* were that user perceived that system respect users' freedom and rights and protect their information, privacy and enable private use of the system. These outcomes were linked to an improved motivation level and increased enthusiasm to participate, as well as increased trust toward the system. This consequently rendered that more finds were being documented and the thus the quality of information gets better and that the identification gets easier then. Additionally the participants expected the database becoming more convincing and credible after that. This also cause that abuse and other misbehaviour appears seldom. *Setting up hobbyist profile* derived to the socially oriented consequence theme including: being able to assess the trustworthiness of other persons, can get to know and identify other persons, being capable of contacting them, possibility to find people with similar interest and to make friends, and finally more practical, being able to find people with certain skills and competences for certain purposes. As for feature *roles*, participants perceived that by offering suitable roles for each type of user, would result lifting up the motivation and trust toward system and hence more active contributors would appear to the system. This again leads to situation when there's more finds documented and better opportunities for identification. *Registration* was considered to increase trust and make easier to recognize assess trustworthiness of others. *Identification* had two different consequence outcomes, depending on whether the real identity or anonymity was used; real identity leading to openness and transparency, the anonymity leading improvements of participation levels.

Values: The most often mentioned values linked to the aforementioned features included again the history and archaeology research. The ultimate value and goal many participants had were related to interest in past and revealing and protecting historical secrets and information. Mainly these values were attributed to roles, registration and adjusting content sharing settings features. Social relationships and identification and helping others were predominantly linked to setting up hobbyist profiles and those other social features. Learning and thirst for information were also linked to the social features. Privacy and legal protection and trust were also important values derived from adjusting content sharing and privacy setting.

Figure 9 – Communication (GGG)

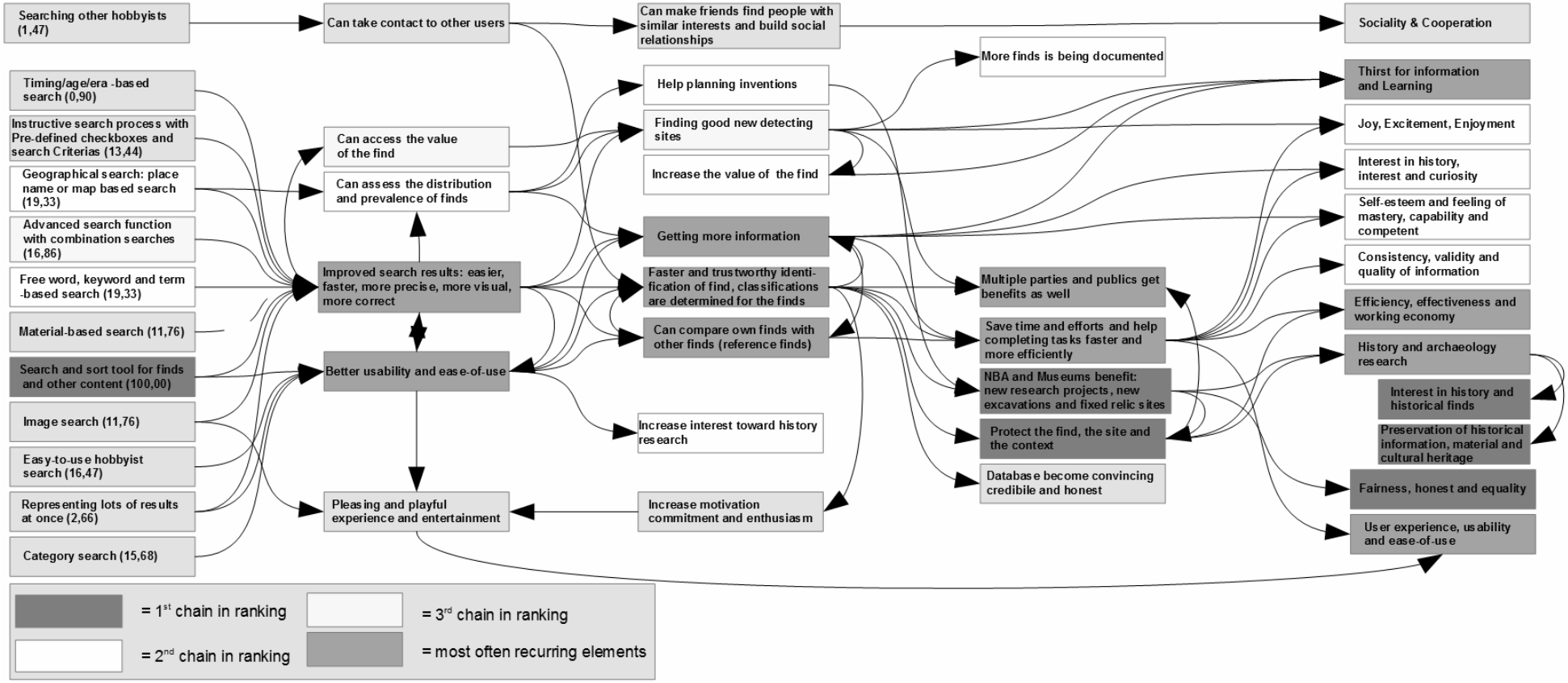


Features: The top three features in cluster GGG consisted of a feature *to contact other hobbyists* (45.45). Especially NBA associates and professional interviewees thought the capability of taking anonym contact to hobbyist would be necessary feature in this database. Second one was *a discussion forum* (20.80) and *private messages to other hobbyists* (15.28) and very closely to that ranking, *a receipt and update concerning own or other finds* (14.33) as participants told they want to have updates from the system. Other less significant features were a *comments and discussions related to finds and images* (7.78), *means to arrange and publish meetings* (5.10), as many participants thought meetings incorporating both hobbyists and experts would be good idea, *news section* (3.92) and finally *possibility to take contact to museum and professional people* (3.66) (see above Figure 9).

Consequences: The prevailing consequences attributing to above *communication features* were increased motivation commitment and enthusiasm, and increased sense of community and togetherness. This was especially the case concerning *contact taking features, receipts from the database and news section*. The second most often mentioned consequence was gaining social (and self) rewards, such as being thanked, noticed and appreciated. This consequences linked especially to *contacting tools.* Other consequences were, to be able to contact other hobbyists, finding people with similar taste and making friends, being able to share experiences, and getting help. Beside the above social consequences, the third most important bundle of consequences in this cluster included getting more information and enabling faster identification. That was thought to benefiting research and researchers, and NBA and museums. The features in this cluster were also linked to consequences of having more convincing database, better quality of information, more cooperation and having better usability.

Values: Not surprisingly the most important ultimate value driving behavior with regard to these features was the social relationships and identification added with helping others, and self-related value, namely, respect, appreciation, encouragement and recognition. The second largest value bundle in this cluster was learning, understanding, self-cultivation and civilization. For some, the social interaction seems to be primary, and for another ones it's a merely secondary purpose. Third bundle was history and archaeology research added with preservation and history awareness bundle. Other less significant values derived from communication features were metal detecting hobby, user experience, usability and ease-of-use, and production of academic information, meaningfulness, common trust.

Figure 10 – Searching and information retrieval (HHH)

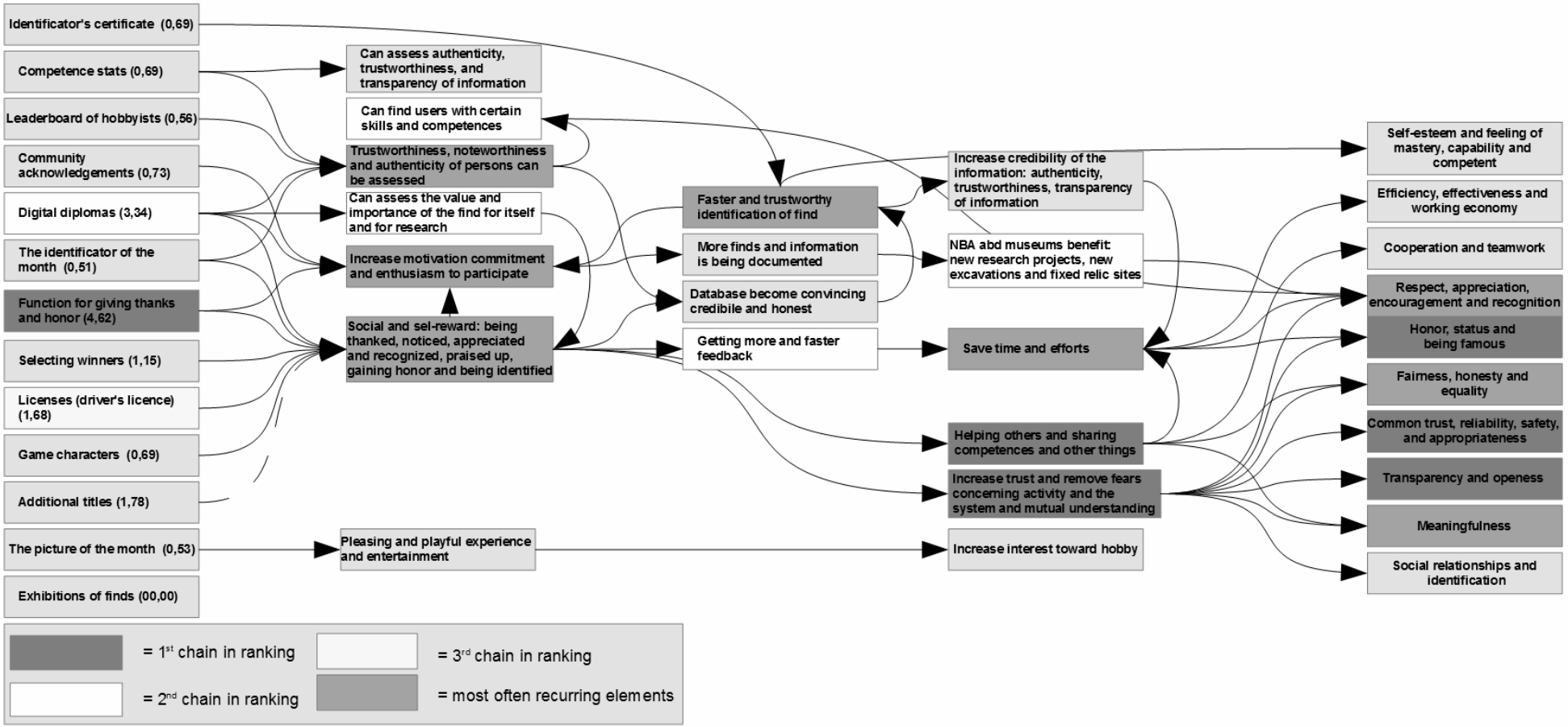


Features: The top three system features in the HHH cluster were *the search and sort tool for finds and other contents* (100.00), which collected highest ranking points of all single features in this study. The second one (with significantly lower points) was *geographical search* (19.33), i.e. place name or map-based search function and *free word, key word and term-based search* (19.33). The third feature was *advanced search function with combination searches* (16.86). The combination searches pertain to capability to include multitude of search criteria for the search at the same time as well as narrowing-down the search results with adding or reducing new criteria. Those participants with high information demand, such as researchers or some hobbyists, often suggested this feature too. Almost as many ranking points collected *easy-to-use hobbyist search* (16.47) and *category search* (15.68). The rest of the significant features as for searching functionality were: *instructive search process with predefined checkboxes and search criteria* (13.44), *material based search* (11.76) and *image search* (11.76). The search function also should *represent lots of informative search results with images* (2.66) (see above Figure 10).

Consequences: Better search results and better usability and ease-of-use were the main outcomes having the aforementioned searching means. These two consequences preceded identification related consequence bundle, i.e. faster and trustworthy identification and classifications to be determined. Improved search results helped getting more information and comparing own finds with other finds, which also facilitated the identification process. The better usability and improved identification process were followed by consequence of saving time and efforts, which were fourth often, mentioned single consequence in this cluster. Other consequences suggested derivative to the search functions, were possibility take contact to other users, and finding good new detecting sites. The former was directly linked to user search and the latter to map-based search features. Minority of participants also perceived that good search functionalities together with its multiplicative effects, provides with general benefits for multitude of different users, such as students, teachers, and exhibitors, not just hobbyists.

Values: Concerning the underlying values, the history and archaeology research added with interest in history and historical finds as a bundle, was the largest value bundle in this cluster. This value theme appears again to be the most important ultimate goal theme attributing back to aforementioned searching features. Nevertheless, the most often mentioned single value was user experience, usability and ease-of-use together with efficiency, effectiveness and working economy. Former directly pertain to the system's usability and functionality, such as easy-to-use searching functions. Latter represent the ultimate value type, which were common especially amongst professional participants. Less significant value categories the participants mentioned were as follows: interest and curiosity, self-esteem and feeling of mastery, and fairness and honesty, participation and finally joy of finding and enjoyment.

Figure 11 – Incentives and rewards (JJJ)

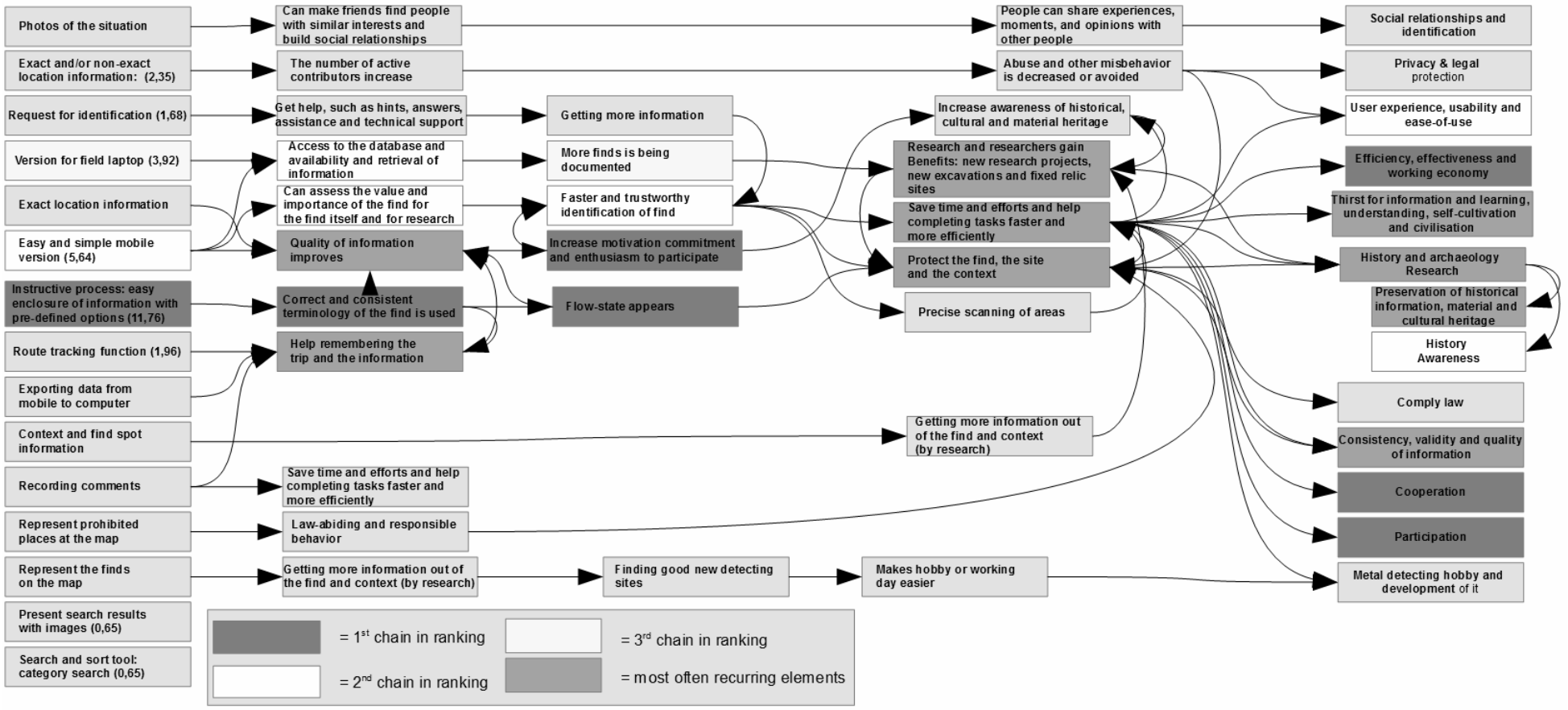


Features: Following system features were aggregated to FFF cluster: *Function for giving thanks and honour* (4.62), *digital diplomas* (3.34) and so called *'driver's licenses'* (1.68). These system features, reflect the participants' need for getting acknowledgements as a reward of them making favour to other people. Digital diplomas pertain to the certificates and diplomas received from NBA for declared finds. Some participants mentioned that these diplomas could be showcased or even handed to hobbyists digitally through this database. Licenses were suggested to be given to those hobbyist who take part for example identification courses. Other less significant feature ideas were; *additional titles* (1.78), *selecting winners* (1.15), *community acknowledgements* (0.73), *game characters or avatars* (0.69), *competence stats* (0.69), *identificator's certificate* (0.69), *leader board of hobbyists* (0.56), *the picture of the month* (0.53), *the indentificator of the month* (0.51), and *exhibitions of hobbyists made finds* (00) (see above Figure 11).

Consequences: Wealth of all consequences in this cluster related to gaining social and self-related rewards, such as being thanked, noticed, appreciated, praised up and recognized, and gaining honour. Generally speaking, giving any kind of acknowledgements, thanks or appreciation helps the participants feeling good and motivated about them. The aforementioned features, therefore, were often considered contributing to increased motivation commitment and enthusiasm to participate, which was second largest consequence category in this cluster. Those features, revealing something about user's gained achievements and developed competences, were linked to capability of assessing person's trustworthiness, noteworthiness and authenticity. This was necessary thing for those who hesitated to whom to take contact in order to acquire information or to invite to a research project. Other consequences derived from features in this cluster were faster identification of finds and therefore save time and efforts.

Values: The largest value categories attributed to incentive features were fairness, honesty and equality, respect, appreciation, encouragement and recognition, meaningfulness and gaining honour, status and being famous. These value categories indicate that to get the participants feeling fairness, meaningfulness and appreciation, the aforementioned features are means to get it to materialize. The features also contributed fulfilment of other values such as self-esteem and feeling of mastery and social relationships.

Figure 12 – Mobile version (MMM)



Features: The mobile version was not a major desired system feature theme for the majority of the participants. Yet the majority of those who end up choosing stimuli theme 2, highly valued this ”feature” theme. The three top ranked system features concerning mobile version were: *instructive process and easy enclosure of information with pre-defined options* (11,76) for adding finds, *easy-to-use and simplistic mobile version and user interface* (5,64) and *version for field laptop* (3,92). Other lower ranked ones were: *exact or non-exact location information* (2.35), *route tracking function* (1.96), *request for identification* (1.68) and *search and sorting tool* (0.65) which enable category searches in the mobile version. Other notable feature suggestions for mobile version were: *taking photos of the situation*, *capability to export data from mobile version to computer*, *recording comments of find context*, and *representing prohibited places at map* (see above Figure 12).

Consequences: Uppermost consequence attributed to above features is save time and efforts. Participants expected that with *easy-to-use instructive mobile version* the task of collecting finds information and delivering it to the database to be easier and faster. They thought that once the application instructs what information is collected, the correct and consistent terminology is used, which improve the quality of information in database. A flow state was mentioned one possible consequence of having smoothly functioning instructive software. This was also linked to increased motivation and commitment and enthusiasm. One major outcome from *mobile app* also is that it help remembering the trip and information concerning find spot and location, so the participant does not have need to remember everything self. According to participants, this has also a positive correlation with the quality of data. Some participants mentioned that by having instant access to the database at the find spot, the find is being identified faster. This help taking a correct stance toward the find. For example if the find is a valuable pre-historic artefact with high potential for research, it should therefore be treated and recovered accordingly. So having instant access to the database protect the critical information, find itself and the site. This potentially cause benefits for other beneficiaries such as NBA and researchers.

Values: The most often mentioned value categories in this cluster were preservation of historical information, followed by the consistency, validity and quality of information. These values can be attributed to the mobile version's capability of fast provision of exact information and delivering faster identifications of finds, which enable initiating protection activities soon after spotting fixed relics. The user experience was third often-mentioned value category. This category relates to attributes such as *easy-to-use mobile version*, and *instructive process of submitting information*. Other value categories mentioned herein were efficiency and thirst for information and social relationships.

7.6 What features to offer to deliver on the key values?

Given that stimuli distributions and network maps were above reviewed, in this chapter the value bundles are being reviewed in terms of which feature clusters contribute them best. Drawing on the dataset the most important value bundles included: *Interest in history & history research*, *Self-esteem and learning*, *Sociality and status*, *Task efficiency*, *Experience and enjoyment*, *Credibility*, *Trust & security* and finally *Quality of information*. To make any suggestion, which feature clusters to be offered to fulfilment of each value, the distributions are being compared to average distribution weight (11.11%).

Based on the dataset, the *history research* value bundle was most often contributed by the feature cluster *CCC - Find information* (39.49%) (See below Table 44).

Table 44 – HISTORY RESEARCH's distribution on feature clusters

Σ	AAA	BBB	CCC	DDD	FFF	GGG	HHH	JJJ	MMM	Value name
76	10	4	36	3	8	7	6		2	History and archaeology research
29	2	2	4		4	4	4		9	Preservation of historical information, material and cultural heritage
21	1	1	9	7	1	1	1			Research of local history
15			8	2			5			Interest in history and historical finds
12	1	1	3	1	1	2	2		1	History awareness
3			1	1		1				Love and pride related to home place
1			1							Research of family history
157	**14**	**8**	**62**	**14**	**14**	**15**	**18**	**0**	**12**	**In total**
	8,92%	**5,10%**	**39,49%**	**8,92%**	**8,92%**	**9,55%**	**11,46%**	**0,00%**	**7,64%**	**Percentage**

The cluster *CCC - Find information* outperformed other clusters markedly. However it's notable that HHH cluster performed around averagely (11.46%). All other clusters were moderately or significantly under weighted. Interestingly ”Preservation of historical...” value bundle is most often contributed within feature cluster *MMM – Mobile version*. This suggests that building easy and simple mobile version with instructive process of registering find information (such as location information, and photo), as well as showing prohibited places at map in the mobile version, are contributing toward fulfilment of the preservation value category.

The second of all value bundles was so called *Self-esteem and learning* (see below Table 45).

Table 45 – SELF-ESTEEM AND LEARNING's distribution on feature clusters

Σ	AAA	BBB	CCC	DDD	FFF	GGG	HHH	JJJ	MMM	Value name
40	4	1	8	3	5	10	6		3	Thirst for information
24	4	1	5	3		8	2		1	Learning, understanding, self-cultivation and civilisation
18	1	1	5	4	2		5			Interest and curiosity
15		1	4	2		2	4	2		Self-esteem and feeling of mastery, capability and competent
13	1	1	1	3	2	2		3		Respect, appreciation, encouragement and recognition
12	1	1		3	2	1	3		1	Participation
9	1		1	1	1	3		2		Meaningfulness
4				2	1		1			Independcy, autonomy and freedom
4			2	1			1			Solving problems and mysteries, building puzzles
0										Power
139	**12**	**6**	**26**	**22**	**13**	**26**	**22**	**7**	**5**	**In total**
	8,63%	**4,32%**	**18,71%**	**15,83%**	**9,35%**	**18,71%**	**15,83%**	**5,04%**	**3,60%**	**Percentage**

As for this value bundle, in particular the feature clusters CCC - *Find information*, (18.71%) DDD – Identification of the finds, (15.83%), GGG - *Communication*, (18.71%) and *HHH – Searching and information retrieval* (15.83) were often mentioned clusters to foster fulfilment of that value theme. These four themes were somewhat over weighted compared to average distribution. Other themes were slightly or moderately under weighted. Interestingly ”Learning.” and ”Thirst for information” were perceived best fulfilled in cluster GGG i.e. offering good communication means. This suggests that to promote learning, the social activity to be supported, as this most often leads to learning outcomes.

The sociality value bundle was most often fulfilled by the features aggregated into cluster *GGG - Communication*, (26.19%) (See below Table 46)

Table 46 – SOCIALITY & STATUS's distribution on feature clusters

Σ	AAA	BBB	CCC	DDD	FFF	GGG	HHH	JJJ	MMM	Value name
43	4		6	6	7	14	2	2	2	Social relationships and identification
14		1	2	2	3	5	1			Helping others and sharing things with them
13	2		1	3	2	2	1	1	1	Cooperation and teamwork
6	1	1	1	1	2					Showing off
5			1		1	1		2		Gaining honor, status and being famous
3		1		1	1					Competition
84	7	3	11	13	16	22	4	5	3	**In total**
	8,33%	**3,57%**	**13,10%**	**15,48%**	**19,05%**	**26,19%**	**4,76%**	**5,95%**	**3,57%**	**Percentage**

Sociality & status –related values were also promoted by features of *FFF - User information, security and content sharing settings*, (19.05%) and *DDD – Identification of the finds*, (15.48%) as well as *CCC - Find information,* (13,10%). Other feature cluster seemed not having significant relationships to these values. Interestingly ”Helping others...” was most often associated to GGG feature cluster, whereas ”Cooperation and teamwork” was best fulfilled by DDD cluster? This indicates that cooperation is highly task-oriented value, unlike helping others. The value ”Showing off” was linked most to FFF cluster, hence, setting up the user profile.

The third most often mentioned value bundle, labelled as *Task efficiency,* was significantly attributing back to features of *CCC - Find information*, (27,54%) and *DDD – Identification of finds*, (18,84%) (See below Table 47).

Table 47 – TASK EFFICIENCY's distribution on feature clusters

Σ	AAA	BBB	CCC	DDD	FFF	GGG	HHH	JJJ	MMM	Value name
32	2	2	9	12	1	4	1		1	Identification of finds
24	3	1	5		3	1	7	1	3	Efficiency, effectiveness and working economy
13	2		5	1	2	3				Production of academic information
69	**7**	**3**	**19**	**13**	**6**	**8**	**8**	**1**	**4**	**In total**
	10,14%	**4,35%**	**27,54%**	**18,84%**	**8,70%**	**11,59%**	**11,59%**	**1,45%**	**5,80%**	**Percentage**

Also clusters AAA, GGG and HHH somewhat performed averagely having average relationship to these task efficiency related values. Notable in here is that ”Efficiency, effectiveness and working economy” value category was often related to HHH cluster. Therefore offering good searching tools especially saves time and efforts and therefore facilitates task efficiency value. Another occasion

from this value bundle is that production of academic information is not linked to DDD, but to CCC. This may indicate that those users with academic aspirations favored more availability of quality information, rather than ready answers or substantial support from a community for identification of finds.

The fourthly important bundle, namely *Credibility*, was most often derived from features aggregated in clusters *FFF - User information, security and content sharing settings* (17,24%) *and GGG - Communication*, (17,24%) (See below Table 48).

Table 48 – CREDIBILITY's distribution on feature clusters

Σ	AAA	BBB	CCC	DDD	FFF	GGG	HHH	JJJ	MMM	Value name
24	3		1	4	6	2	4	3	1	Fairness, honesty and equality
13			3	3		5	1		1	Metal detecting hobby and development of it
12	3	1	4	1	2				1	Complement and enforcement of law and order
5					2	1		1	1	Transparency and openess
4			1	1		2				Advancement and improvement generally
58	**6**	**1**	**9**	**9**	**10**	**10**	**5**	**4**	**4**	**In total**
	10,34%	**1,72%**	**15,52%**	**15,52%**	**17,24%**	**17,24%**	**8,62%**	**6,90%**	**6,90%**	**Percentage**

Also clusters DDD, (14.52%) and CCC, (15.52%) were important to contribute toward credibility related values. Other feature clusters had not such a strong relationships to promote this value bundle. Interestingly ”Fairness, honesty and equality” was often derived from FFF cluster's features of adjusting privacy and content sharing settings. Offering means for communication best fulfilled the “Metal detecting hobby”. Complying with law was mostly derived from providing enough information of finds.

The fifthly important value bundle, namely *Experience and enjoyment* was remarkably strong connection to cluster *HHH – Searching and information retrieval,* (28,07%) (See below Table 49).

Table 49 – EXPERIENCE & ENJOYMENT's distribution on feature clusters

Σ	AAA	BBB	CCC	DDD	FFF	GGG	HHH	JJJ	MMM	Value name
27	7	4				5	7		4	User experience, usability and ease-of-use
12		1	3	5			3			Joy of finding and discovering things
10	1	3	2	2			2			Excitement and serendipity
7			1	1	1	1	3			Enjoyment, gratification and satisfaction
1							1			Visuality
57	**8**	**8**	**6**	**8**	**1**	**6**	**16**	**0**	**4**	**In total**
	14,04%	**14,04%**	**10,53%**	**14,04%**	**1,75%**	**10,53%**	**28,07%**	**0,00%**	**7,02%**	**Percentage**

Additionally clusters *AAA – Usability, guidance and content representation*, *BBB – Find registration* and *DDD –Identification of finds*, all them contributing 14,04% each of all contribute to this value bundle. Interestingly ”Joy of finding...” most often was attributed back to DDD cluster, i.e. being able to identify finds. This indicate that the often the feeling of discovering things is actualized in the moment of revealing actual identity of the find. Value bundle ”User experience, usability and ease-of-use” was often derived from features of clusters *AAA*.

The sixth value bundle, namely *Quality of information*, was mostly associated to features of *DDD –Identification of finds,* (29.63%) and *MMM - Mobile version,* (18.52%) (See below Table 50).

Table 50 – QUALITY OF INFORMATION's distribution on feature clusters

Σ	AAA	BBB	CCC	DDD	FFF	GGG	HHH	JJJ	MMM	Value name
27	3	2	3	8	3	2	1		5	Consistency, validity and quality of information
27	**3**	**2**	**3**	**8**	**3**	**2**	**1**	**0**	**5**	**In total**
	11,11%	**7,41%**	**11,11%**	**29,63%**	**11,11%**	**7,41%**	**3,70%**	**0,00%**	**18,52%**	**Percentage**

Other feature clusters averagely linked to fulfilment of this bundle were namely AAA, CCC, and FFF. This indicates that promoting quality of information depends on information contribution and validation mechanisms, such as identification mechanism. This also suggest that mobile version has a significant role in provision of high quality of information.

The seventh value bundle, namely *Trust and Security* was remarkably derivative to *FFF - User information, security and content sharing settings,* (50.00%) as half of all hits were linked to features in that cluster (see below Table 51).

Table 51 – TRUST & SECURITY's distribution on feature clusters

Σ	AAA	BBB	CCC	DDD	FFF	GGG	HHH	JJJ	MMM	Value name
19	1	1		6	7	3		1		Common trust, reliability, safety, and appropriateness
7					6				1	Privacy & legal protection
26	**1**	**1**	**0**	**6**	**13**	**3**	**0**	**1**	**1**	**In total**
	3,85%	**3,85%**	**0,00%**	**23,08%**	**50,00%**	**11,54%**	**0,00%**	**3,85%**	**3,85%**	**Percentage**

Additionally, *DDD –Identification of finds*, (23.08%) and *GGG - Communication*, (11.54%), contributed markedly toward trust and feeling of legal protection. This suggests that providing with suited registration and identification options, privacy and content sharing settings, as well as qualified information by good communication, is perceived as sign of trustworthiness by the participants.

The final eight value bundle, namely *Other extrinsic values*, often attributed to *CCC - Find information,* (66,67%) and *FFF - User information, security and content sharing settings,* (33,33%) clusters (see below Table 52).

Table 52 – OTHER EXTRINSIC VALUES's distribution on feature clusters

Σ	AAA	BBB	CCC	DDD	FFF	GGG	HHH	JJJ	MMM	Value name
2			1		1					Money
1			1							Being in motion outdoors and in nature
3	**0**	**0**	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**In total**
	0,00%	**0,00%**	**66,67%**	**0,00%**	**33,33%**	**0,00%**	**0,00%**	**0,00%**	**0,00%**	**Percentage**

As the limited number of hits to these categories, it's hard to derive any feasible and believable implications from here. The obvious indication however seems to be, that the participants do not associate aspiration of making money among drivers of this activity.

8 Discussion

The main object of this chapter is to discuss findings to the sub-research questions and finally to answer to the main study question and discuss the main research objective. First the two of the sub-research questions are being addressed. Then the main study question is being answered and the research objective is being discussed. Finally the implications for researchers and managerial practitioners are made.

8.1 Initial and ultimate value drivers of find database

From the field study data, drawing on the value data, which reflects the ultimate reasons to participate, eight value driver bundles (i.e. main classes) were found. First two of them, namely *History research i*ncluding interest in the historical finds and preservation of them, and *Self-esteem and learning*, including e.g. thirst for information, learning and respect and appreciation dominated in hits. *Sociality & status* includes social relationships and identification. There were also some other less important value bundles such as *Task efficiency*, *Experience & enjoyment*, *Credibility*, T*rust and security* and *Quality of information*, which followed quite evenly.

As for initial reasons (and the principal desired consequence impact derived from using the finds database.) three largest of them were: *Task efficiency* (completing either hobbyists or professional tasks), *Sociality and status,* and *History research.* Other ones were: *Quantity of quality of information* and *Self-esteem and learning.*

Given above types of initial and ultimate driver types, an analysis of whether the find database is be considered primarily as experiential (hedonic) or goal-oriented (pragmatic) activity was done. Tuunanen et al. (2010) posed that consumers seek a balance of utilitarian and hedonic utility from consumption and that consumption motivation types are both rational (utilitarian) and emotional-based (hedonic). Väänänen-Vainio-Mattila et al. (2010) found out

that both pragmatic and hedonic aspects of the system usage affected user experience in sports communities. Furthermore, some sources suggest that there are goal-oriented and experiential information systems (Govindji, 2008).

To decide which kind of service the find database is, the types of initial and ultimate drivers were determined. From above initial reasons to participate (consequences) eight of ten (80%) of all were utilitarian in nature. These eight consequences were: *1. Faster and trustworthy identification of finds, 2. Quality of information gets better, 4. Save time and efforts and help completion of tasks, 5. Enhanced search results, 6. More finds and information is being documented, 7. Research and researchers gain benefits, 8. Increase credibility of information,* and *10. NBA and museums gain benefits*. Only two of the consequences, namely *3. Increase motivation and commitment*, and *9. Feeling meaningful by gaining social and self-reward* could be linked to emotional and hedonic utility.

As for ultimate reasons (values) to use the system, the similar comparison slightly more weighting toward indicates that they're still more rational sort of drivers, yet notable is that *hedonic values came into play as well as below picture summarizes*. This classifying is based on the definitions suggested in the earlier chapter concerning value drivers and value assessments.

In numbers there was more hedonic values (25) than rational ones (15). In average hits hedonic values (15.16) was beaten by rational values (20.6) (see below Table 53). This suggest that, while pragmatic reasons dominate as an initial reasons to participate, the hedonic reasons often are more likely to be ultimate reasons. It's also noteworthy that many participants, who were shy to tell their actual goals and values, told practical reasons.

Table 53 – Hedonic vs rational ultimate values

Rational (pragmatic) value name	Σ	Hedonic value name	Σ
History and archaeology research	89	Thirst for information	43
Identification of finds	36	Social relationships and identification	43
Preservation of cultural heritage	32	User experience, usability and ease-of-use	31
Consistency, validity and quality of information	27	Respect, appreciation, encouragement and recognition	27
Research of local history	25	Learning, understanding, self-cultivation and civilisation	25
Efficiency, effectiveness and working economy	24	Fairness, honesty and equality	24
Common trust, reliability, safety, and appropriateness	24	Interest and curiosity	22
Cooperation and teamwork	15	Interest in history and historical finds	19
History awareness	15	Self-esteem and feeling of mastery, capability and competent	18
Metal detecting hobby and development of it	14	Production of academic information	15
Complement and enforcement of law and order	11	Participation	15
Privacy & legal protection	7	Helping others and sharing things with them	15
Advancement and improvement generally	4	Joy of finding and discovering things	13
Being in motion outdoors and in nature	4	Excitement and serendipity	11
Money	2	Meaningfulness	11
Research of family history	1	Enjoyment, gratification and satisfaction	10
		Showing off	7
		Gaining honor, status and being famous	7
		Transparency and openess	5
		Solving problems and mysteries, building puzzles	4
		Love and pride related to home place	4
		Indepencdcy, autonomy and freedom	4
		Competition	4
		Visuality	1
		Power	1
Total hits	**330**	**Total hits**	**379**
Average	**20,6**	**Average**	**15,16**

With regards to what actually are the ultimate drivers behind good experiences in service encounters, Väänänen-Vainio-Mattila et al. (2010) listed drivers and hindrances of social user experience (UX): *self-expression*, *reciprocity*, *learning and curiosity*. Listed hindrances were: *unsuitability of content and functionality*, *incompleteness of user networks* and lack of *trust and privacy* hindered social UX. They suggest that especially in the web services driven by user-generated content and social interactions, the means to enhance both pragmatic and hedonic user needs were important. Hassenzahl has posed that *novelty and change, personal growth, self-expression and relatedness* (Hassenzahl, 2008) are important goals for consumers in service consumption.

This study found similar evidence than above two; hedonic self-expression and personal growth and self-expression related *Self-esteem and learning*, and relatedness related *Sociality and status* were among the most important ultimate value drivers of find database use. This is consistent with findings of Väänänen-Vainio-Mattila et al., (2010) and Hassenzahl, (2008) findings. The implication is that when people get these needs to actualize, also the social UX emerges.

Furthermore, upon the findings of this study the previous findings of hindrances of social UX are quite firmly formulated; the pragmatic reasons, such as *faster and trustworthy identification of finds* (functionality), *quality of information gets better* (unsuitability of content), *save time and efforts and help completion of tasks* (functionality), *enhanced search results* (functionality), *more finds and information is being documented* (unsuitability of content), *increase credibility of information* (unsuitability of content), were initially more important than the hedonic ultimate reasons. This support idea that especially themes of *functionality, and unsuitability of content* suggested by Väänänen-Vainio-Mattila et al. (2010) hinder the participation in web services.

Another interesting thing is concerning the *experience and enjoyment value*; Tuunanen et al. (2010) has put that the experience is to be yielding at less frustration for the users. Again, the findings of this study seems to be consistent with Väänänen-Vainio-Mattila et al.'s (2010) findings that the experience (which is hindrance related to functionality) seems not to be the actual end-reason, ultimate driver of use, but rather possible hindrance. The experience and enjoyment was only sixth most important value bundle, which is surprisingly low. One may see here link to Hassenzahl's (2008) notion, that the pragmatic quality's value comes from making fulfilment of the ultimate end goals more easily and likely, and that in itself, usability has no value.

Concerning findings related to *Sociality,* previous literature has found it to be instrumentally valuable for web service users: Ojala and Saarela (2010) studied the social needs and motivations to share data in online sport communities. They found out that through communication and sharing behavior the users wanted to get feedback, social support, new ideas, and simply to share experiences. This is to say that sociality is not always a goal as such, but rather instrument to reaching more important goals. Findings of this study support this idea; *Sociality* bundle was more significant as initial reason as ultimate reason,

which is to say that it functions as means to reach *the history and archaeology research* and *self-esteem and learning* goals rather that being an important value itself.

To summarize and put above findings together with the existing studies, this study suggest that especially services which facilitate information intensive learning and goal-oriented activities, often driven by user-generated content and social interactions, such as: mobile financial services (Peffers & Tuunanen, 2005), e-learning service (Tuunanen and Govindji, 2011), organizational event promotion services (Kaaronen, 2014) as well as metal detecting find identification activity (the major utility of find database), tend to lean towards rational value assessments rather than hedonic assessments. Yet, as Vartiainen and Tuunanen (2013) and Tuunanen, Peffers, Gengler, Hui, and Virtanen (2006) has studied, happiness and utility go side by side and the values revolve around hedonic and utilitarian gains. Yet the emphasis still seems to be on the utilitarian side. Upon the findings, thus in *goal-oriented, non-experimental activities, often-rational goals and outcomes are more important initially at least for their instrumental meaning to reach more hedonic values, which in turn are ultimately more important.*

8.2 Literature findings and field study findings compared

In this chapter, a short comparison of the field study findings to the online community literature review is made;

Value bundles based on the field study findings are matching quite well with the findings of the OC literature findings depicted in the figure (Figure 3), in which a classification from Uses & Gratifications (U&G) theory was used as a basis.

As for field data value bundles *Self-esteem and learning* and *Quality of information*, they fit perfectly to U&G's *Personal integrative needs* and *Cognitive needs*. *History research* perhaps has some connection with other elements, such as *Cognitive needs* too, but it has no a direct counterpart in U&G theory. *Sociality & status* fits well with U&G's *Social integrative needs*. *Trust, honesty and legality and Credibility* have no direct counterparts in the U&G classification, similarly as *Task efficiency* has no its counterpart in U&G. Finally, *Experience & enjoyment* fits to U&G's *Affective needs* and *Tension release needs*.

To sum this chapter, it can be derived that even though our literature review findings of online community users' value drivers nicely are matching with U&G's classification, the field data does not support the current U&G classification as well as the OC literature review findings to the full extent; reason for this might be because of the different nature of information sharing behavior in professional or at least semi-professional context, such as find database use (museum and research groups were involved) compared to media consumption behavior in leisure context.

8.3 Value propositions and feature offerings of find database

Given the value drivers of the end-users of the find database was unearthed, in this chapter value propositions and related technical feature offerings are formulated. To make value propositions approachable, they're formulated into verbal "marketing sentence" form. Value propositions are led from the CSC consequence data. Notable is that these value propositions are just examples; there's millions of different ways value propositions could be formulated. Note, that after formulating a few value propositions, it's recommendable to choosing one or two that capture the most important future impact the service is aiming to accomplish. This study however is not interested in validating the value propositions, which is task of the following IS planning stages, such as ideation workshop.

The value propositions, as its name suggest, are propositions of the future value for the users. This paper defined value propositions as follows:

Value propositions are suggestions and projections of specific outcomes and impacts the customers can expect, as a result of accepting offer.

Term offering is hereby used to pertain to the concrete features planned to make value propositions materialize. In information systems, those pertain to the IS features or IT artefacts.

Given that value proposition pertain to estimated impact what customer can expect upon accepting the offer, the development of value propositions must be based on the predicted desirable consequences linked to the offered features. So far there's no better information for that purpose.

As discussed, ten consequence bundles were aggregated from total of 71 consequence codes. Provided with the consequence bundles and combining them in reasonable groups, six value proposition classes was formulated as follows: *Task efficiency: Save time and efforts, Content: Quality and Quantity, Social nature of use: Friends and contacts, Good governance: Credible, responsible and safe, Usability and System quality: Service Process Experience*, and *Rewards and incentives: Improve fit & gain money*.

Following paragraphs show how these value propositions were formulated:

As for *Task efficiency: Save time and efforts*, it combined Task efficiency and History research bundle. Both of them were related to need to get right things done without wasting time and efforts. Before showing the written value proposition for this value proposition class, the basis on which the value proposition stand is discussed. As to Task Efficiency bundle, typifying characteristics of all impacts in this bundle is that the system substantially supports the user in whatever task is at hand, be it hobbyist's task or professional's task. In this specific type of online community, the most often "the task" for hobbyist is the identification of the find. Moreover, often the task for professional user is save time and efforts and to help completing tasks. Therefore the first value proposi-

tion would be as follows: "Get your find identified immediately - save time and efforts". As for offering, in order to facilitate tasking processes of users, the feature clusters CCC - Find information, HHH - Searching and information retrieval and DDD – Identification of the finds most often contributed these consequence positively. With regards to History Research comprised following consequence categories: NBA and museums gain benefits: new research projects, excavations, and fixed relics. Protect the find, the site and the context, Multiple parties are beneficiaries, Research of local history gain benefits, More fixed relics is found, to mention few. Thus the value proposition pair for this impact bundle to be created as follows: "Help finding fixed relics and support the history research and protection of cultural heritage". As for feature offering, feature clusters CCC - Find information, AAA - Usability, guidance and content representation and GGG - Communication included most suited features to make these impact promises to turn into reality.

Therefore, a combined value proposition for this Task efficiency: Save time and efforts value proposition is:

"Get your find identified immediately while helping in finding fixed relics and support the history research and protection of cultural heritage"

The second value proposition for the find database, namely *Content: Quality and Quantity*, consists of three consequence bundles, namely Quality of information, Quantity of information and Self-esteem & learning.

Quality of Information, consists of the following categories of consequence: Quality of information gets better, Enhanced search results, Credibility of information improves, and Correct and consistent terminology is used, to name few. Drawing on the former impact types, the next value

propositions to be suggested: "Suited procedures to prove credibility of information", and "Queries of all kinds even for demanding users". As for offering, especially DDD – Identification of the finds, HHH -Searching and information retrieval, and CCC - Find information feature clusters were valuable.

Quantity of information, consists of following consequences: More finds and information is being documented, Getting more information, Getting more information out of the find and context (by research) and Accumulation of information into one storage place. Therefore the following value proposition to be suggested: "Largest hub of voluntarily recorded finds". As for offering, GGG - Communication, CCC - Find information, DDD – Identification of the finds to be implemented.

Self-esteem and learning is combined of following consequence bundles: Increase motivation, commitment and enthusiasm to participate, Feeling meaningful by gaining social and self-reward, Being thanked, noticed, appreciated, and recognized. Learning, improving skills and gaining competences, and Taking hobbyists' opinions into account, to name few. As for offering to target this value proposition, the clusters GGG - Communication, JJJ - Incentives and rewards, and DDD – Identification of the finds, to be implemented. Thus a value

propositions to be suggested for this value proposition is as follows: ”Learn more in social manner.”

Thus the combined value proposition for Content: Quality and Quantity would be as follows:

”Learn in social manner using high quality searches and results from the largest database of hobbyists-made finds"

Third value proposition of find database, namely *Social nature of use: Friends and contacts*, combines of Sociality and status and Quantity of members consequence bundles. It is constituted by following impact types: Can take contact to other users, Can make friends, Can get help, Cooperation and teamwork, Persons' trustworthy can be assessed, Can identify other users better and Can find users with certain skills and competences, to mention few. As such, the second value proposition pair to be as follows: ”Share hints, experiences, and find other like-minded hobbyists”, and ”The hub of skilled metal detectorists for research purposes”. As for related offering, feature clusters GGG - Communication, FFF - User information, security and content sharing settings, and DDD – Identification of the finds, most often contributed this consequence bundle.

Quantity of members comprises of consequence categories as follows: The number of active contributors increase, Increase interest toward history search, and Increase interest toward hobby. As such, the following value proposition to be created: ”Increasing awareness of the history research hobby”. As for offering, especially CCC - Find information cluster to be implemented. Also AAA – Usability, guidance and content representation, DDD – Identification of the finds, and FFF - User information, security and content sharing settings, to be offered.

Therefore the following combined value proposition is formulated based on above consequence bundles:

”Share hints and experiences with others, find other like-minded people or project members here - and contribute positively to hobby!”

The fourth value proposition of a find database, namely *Good governance: Credible, responsible and safe* is combined of Credibility and Trust & security consequence bundles.

Credibility is combined of following consequence types: Database becomes convincing, credible and honest, Law abiding and responsible behavior, and Less abuse and misbehaviour. Drawing on that, the next value proposition is announced as follows: ”Responsible activity”. As with offering, especially the feature cluster FFF - User information, security and content sharing settings to be implemented. Also GGG - Communication and AAA – Usability, guidance and content representation and DDD – Identification of the finds to be built.

Trust & Security consist of following two consequence categories: System respect user's freedom and rights, protecting information, privacy, and Enable private use, and increase trust and remove fears concerning the activity and the

system. Consequently the value proposition to be suggested: ”Securing your identity and information”. As for an offering, to make people feel secured and feel trust, substantially the most important cluster was FFF - User information, security and content sharing settings. Another important feature cluster was GGG – Communication.

Therefore the combined value proposition for this one is as follows:

"*Protect and share finds in a responsible and secure way!*"

The fifth value proposition, namely *Usability and System quality: Service Process Experience*, is combined of Experience and enjoyment consequence bundle. It comprises of following consequence categories: Pleasing and playful experience and entertainment, Access to the database and availability of information, Flow state, and better usability and ease-of-use. As for offering: To create experiences following two feature clusters at least to be offered: HHH - Searching and information retrieval, and BBB - Find registration.

Therefore the fifth value proposition for the find database to be suggested as follows:

”Easy and enjoyable way of documenting and storing finds.”

The final consequence bundle, namely *Rewards and incentives: Improve fit & gain money* consists of only following consequences: Can get money, and Physical fit gets better. The value proposition suitable for it is as follows:

”Improve fit and gain money”

As for offering, in an effort to get this promise turn into reality, according to dataset BBB - Find registration, and GGG - Communication, to be implemented.

In the next chapter the value propositions and value drivers are put together in the value co-creation table of the find database.

8.4 Value co-creation in task oriented online communities

Above chapter formulated the system value propositions of the find database. In this chapter value driver elements are shortly described upon the field study value bundle data.

The most important value driver of find database upon the value bundle data is *Self-esteem and learning*. As information quality was also important value bundle, *High quality of information* has been incorporated here, as learning can be based on quality of information only.

The second most important value bundle was *History research*. It has been labelled as *Subject of interest*, as different online communities have also different

domains of interests. *Sociality & status* as the third most important value bundle is the next value driver class of the value co-creation table.

Task efficiency is fourth important value bundle upon the field study data. Yet, it has been renamed as *Completionism*, as that concept captures nicely the target and need of getting things done fast; get things completed in a determined and efficient manner. *Experiences & enjoyment* is the fifth largest value bundle, so it's the next value driver class in this table with a new label: *Gratification & enjoyment*. This pertains to those affective and hedonistic feelings, such as relaxation, enjoyment and tension release, whose are related to initial emotional responds to service usage. *Trust, honesty and legality and Credibility* value bundle is a collection of minor values, so it's not been placed on the driver's side; it 's however, in this equation as part of *Good governance* value proposition, which indicates that this is also important thing for the user, yet which is not for sure actual driver of use, but at least hindrance of use if it's not got done in good way.

In below figure (Figure 13) based on the field study data, the system value propositions and customer value drivers of *information intensive, task oriented and often user-made content driven online community* are illustrated as follows:

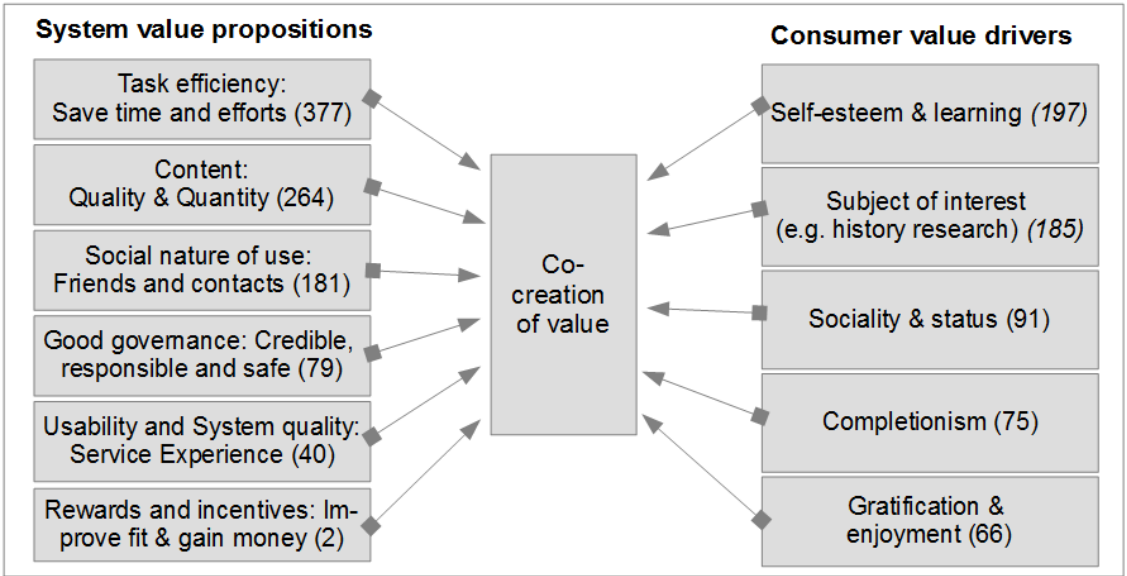


Figure 13 – Value propositions and customer value drivers of information intensive & task oriented web services

8.5 The feature offerings of the find database

In this chapter the feature offerings suitable to fulfill above value propositions are summed up. The end-users interest to the historical finds and things and willingness to work toward history research, were best delivered on by offering lots of find information attributes (CCC), and excellent searching tools (HHH),

offering good usability, guidance and content representation functions (AAA), and communication functions (GGG) (see below Table 54). Given that the information system is to nurture an information intensive hobby like metal detecting, history and archaeology research, information provision aspects and searchability plays in an enormous role in the software. Yet, usability and content presentation seems to be important facilitators of the activity.

Table 54 – Feature clusters to foster History research value

Cluster ID	Name of feature cluster	Examples of features
CCC	Find information	Collecting high quality photos of finds, publishing exact contextual information of the find spot, and as exact location information of find as possible, providing with classifications for the finds, cross-linkings the finds (tags) to enable comparisons
HHH	Search functions	Geographical search, i.e. place name or map based search, advanced search function with combination searches, category search, free word, keyword and term-based search and timing/age/era -based search
AAA	Usability, guidance and content represetantion	Representing finds on a map, offering links to external sources, offering generally easy-to-use system, and enabling content sharing, as well as giving guidance in different matters
GGG	Means for communication	Means to take contact to other users, a discussion forum for public discussions, enabling arranging meetings, enabling commenting and dicussions on finds and images, getting receipts and updates concerning find, and enabling contacts to museum and research people

Additional to above field study findings, OC literature review suggested (see Table 4) additional *communication features* such as: social presence and awareness functions, chat, group formation tools, peer support mechanism, status updates, tools to show empathy and member directory and list of masters. With regards to Usability OC literature review suggested also animated demos and videos, diary function, tutorials, no-risk trials, multilingual and cross-platform interactions. Concerning *Content features*, OC literature review offered also most popular contents and most viewed contents functions.

As it was suggested earlier on, find database use is a goal and task oriented activity. Typical tasks were enabling faster and efficient identifications of finds and solving problems faster, enable assessing the value and importance of the find, help finding new detecting places, help accompanying research teams and doing academic research, and thus saving time and efforts and enhancing working efficiency. From the point of view of carrying out tasks more efficiently, that goal was often connected with above-mentioned searching functions (HHH), usability and guidance matters (AAA). New elements were to support especially this aspect, were tools to registering finds to database easily (BBB) and suited aids to complete identifications of finds (DDD) (see Table 55).

Table 55 – Feature clusters to foster Task efficiency

Cluster ID	Name of feature cluster	Examples of features
BBB	Registering finds to the database	Offering instructive and easy to use process of enclosuring information, through declaration form, and adding finds to the system, supporting declaration of finds to NBA, and capability of adding & editing find information afterwards.
DDD	Tools for identification of finds	Helping the finds identification, such as offering a find identifying mechanism or identification room, in which community and museum, professional or admin level identification and validation for finds is being made

A need for high quality of information may be rooted to the fact, that participants of such information dependent forms of activities, benefits high quality of information much more than quantity of information. So in particular, a mechanism to validate and refine information either by the community or other professional parties are of the necessity of find database (DDD).

Again, from the viewpoint of production of quality of information, a yet non-mentioned cluster popped up, namely mobile version of the database (MMM) (see below Table 56).

Table 56 – Feature clusters to foster Quality of information

Cluster ID	Name of feature cluster	Examples of features
MMM	Mobile version	Easy and simple mobile version with instructive process of registerring find information (such as location information, and photo), as well as showing prohibited places at map in the mobile version, are contributing toward fulfillment of the preservation value category.

As with quantity of information, excellent communication means (GGG), multitude of information attributes (CCC) and identification tools (DDD) to be offered to provoke communication and information production.

The self-esteem related topics, such as learning, thirst for information, respect, and independency and solving problems, was the second largest value driver class. These values were most often associated to above mentioned find information (CCC), identification means (DDD), communication tools (GGG), searching tools (HHH). As a yet-not-mentioned feature cluster, the incentive and reward mechanism (JJJ), was associated also to that value (see below Table 57).

Table 57 – Feature clusters to foster Self-Esteem

Cluster ID	Name of feature cluster	Examples of features
JJJ	Incentive and reward mechanisms	Function for giving thanks and showing honor to other users, enabling digital diplomas showcased based on find handed to NBA, and enablig reaching licences. Other ones were offering bonus titles for most qualified and enabling choosing winners.

As for OC literature review, following additional features were offered to incentivize users: acknowledging helpful contributions, showing achievements, rewards for accomplishments, rating schemes, gifts, power levels, point collection mechanism, privileges, career advancements, visibility to contribution, monetary and economic reward, credits, ceremonies, voting, loyalty program, and rewards for both uniqueness and quality of contribution.

Although the activity is information intensive and highly task oriented, the sociality, such as building relationships, helping others, and cooperation & teamwork, plays a significant role as to motivators toward taking part to the activity. Additional to the above mentioned features (which from especially cluster GGG was important in terms of sociality), these things were best delivered on by offering suited means to set up a user profile with personal styles, anonym registration, and to adjust privacy and content sharing settings (FFF) (see below Table 58).

Table 58 – Feature clusters to foster Sociality		
Cluster ID	**Name of feature cluster**	**Examples of features**
FFF	**User information, security and content sharing settings**	Enabling setting up hobbyists profiles and thus capabilities to showing special interests, revealing the region where operating, adjusting personal styles, and publishing related other information of self. Yet, on the contrary, also anonym profiles to be enabled, capabilities for adjusting privacy and content sharing, and sustaining limited access to sensitive information of other users, to be offered.

The credibility of the system, and related fairness and honesty, transparency and openness, and legality, as well as a trust and security, were best fostered by enabling users to decide whether they use their real names or aliases, and to adjust how s/he go about any kind of sensitive information stored in the system. Therefore a suited content sharing and privacy adjustment settings are to be offered (FFF). Also through excellent communication means trust was to be enhanced (GGG).

According to this study, experience & enjoyment is important, yet, not the most important value driving the behavior. However, to facilitate good experiences and foster feeling pleasure, especially suited searching functions and methods to be offered to the users (HHH). Important was also to offer a good general usability, suited content representation forms (AAA) and easy-to-use instructive information adding and editing tools (BBB).

With regards to how to get lots of people be interested to joining to the service, the analysis of the data reveal as follows: by offering especially an accurate information of finds (CCC), easy-to-use content adding features (BBB), and means to foster find identification (DDD), the more people is more likely to join to the activity.

Below table (Table 59) combines all feature clusters based on the ranking sums they collected.

Table 59 - Ranked feature clusters		
Cluster	**Cluster name**	**Ranking**
CCC	**Find information**	**484,76**
HHH	**Search functions**	**229,68**
DDD	**Tools for identification of finds**	**226,63**
AAA	**Usability, guidance and content representation**	**169,87**
FFF	**User information, security and content sharing settings**	**142,69**
BBB	**Registering finds to the database**	**134,91**
GGG	**Means for communication**	**131,65**
MMM	**Mobile version**	**29,28**
JJJ	**Incentive and reward mechanisms**	**15,99**

To sum, Critical Success Chain methodology was used to foster deep interaction and to model the relationships of desired features, consequences and underlying values. Consequently, values were classified using U&G theory classes

and consequences were used as basis to formulate value propositions. As with each propositions, a concrete feature offering was offered, pointing to each feature clusters found in this study. As a result a deliverable of system value propositions and end-user value drives was collected (see Figure 13).

8.6 Comparison of Consumer Information System and findings

In this chapter the CIS's value driver elements, which were used as seeds in stimuli list construction, are compared to those actual value types found from the dataset. In this study the concept value driver was used to pertain all motivational, value related factors driving user to using the system. CIS framework suggests six distinct aspect and challenge elements concerning development of digitized services. First three, namely *Social nature of use*, *Context of use* and *Construction of identities* it hypothesizes as system value propositions of consumer information system. Following three, namely *Service process experience*, *Goals and outcomes* and *Participation in service production* it suggests as system customer value drivers of consumer information system. As were discussed in CIS paragraph, those are basing on the aspects and challenges of IS development noticed from previous IS literature. As above described this study has elicited a corresponding set of value propositions and customer value drivers in the find database online community context. Is CIS suggestion of value propositions and drivers split correct with the data of this field study? It's topic of this chapter.

8.6.1 Value propositions in comparison

With regards to the first three system value proposition elements, beginning with *Social nature of use,* it was chosen as primary stimuli by 16,67%, which a actually exactly the average weights (16,66%) (Table 15). Additionally *Social relationships and identification* was the third most important value proposition class suggested upon the field study data (Sociality and Status: New friends and contacts with 181 hits). Additionally, this theme was the second most mentioned single value category in the field data. This indicates that this element was important to find database users as value driver. The implication is that this particular CIS's value proposition element match quite well to the value propositions and drivers of the find database upon this field study data. Yet, CIS has not explicitly articulated that Social nature of use, besides being a system value proposition, is also an important value driver class.

As for CIS's value proposition element namely *Context of use*, it was least weighted stimuli category in the interviews with only 4,17% weight, being significantly less than average (Table 15). Moreover from similar consequences only *Access to the database and availability of information* was mentioned in interviews. Additionally the only value category, which can somewhat be linked to

that element (in the meaning that different context should be involved in service production) is *Fairness, honesty equality,* which is the 13th most popular value bundle of all.

To recap what this element originally pertained to; it suggested that involving cultural contexts in different geological locations in development of the IS (Tuunanen et al. 2010), and that offering service for various purposes or accidental other ways to use the system (Kaaronen, 2014) are important for end-users. Thus, given Context of use element is to be understood as whether users can adapt to the service with different kind of user habits (accidental or not) then it's also far more difficult to distinguish this element from other elements; any different uses of the service, other than the official one thing which the service is built, can be then considered confirming this element. The implication is that this CIS's element is *obscure to the extent, that it does not show significance to the users of find database, nor it seems not to be relevant value proposition*. Therefore it is not a coherent independent value driver class of service customers. Yet, everyone knows that involving *context of use in the development of digitized service* is crucial thing for succeeding, so it could be rather labelled as *a success factor of digitized service innovation.* Existence of this element may also be attributed to the fact that CIS was originally a collection of special challenges and aspects of digitized service development.

To avoid the problem of *Context of use* being a merely design aspect, this element in some studies (this study, Vartiainen & Tuunanen, 2013) has been formulated differently in the stimuli descriptions to variegate and to make it more apt from the original meaning of it. In this study there was additional interpretation added to the stimuli description; *a mobile version of the database*. It's not representing the original theory basis of this context element. The note of mobile app produced basically all hits to this theme in this study. In Vartiainen & Tuunanen's (2013) study it was interpreted as a natural context experienced while doing Geocaching. In their study this element was the most weighted element. It, again does not tell anything about how Geocaching users value the original idea of this element, namely that different contextual users should be involved to the development of IS or accidental uses of the service. This finding has been reproduced in at least two studies; Kaaronen (2014) found out that *context of use* was a least weighted element, which is consistent with the results of this study and confirm the suspect that this element is not a valid value proposition nor customer value driver, but *rather a critical success factor of development of such service*.

Considering CIS's element *Construction of identities*, the notion is that it was least weighted stimuli category in the interviews with only 4,17% weight, being significantly less than average. This is the case not just in this study, as also Vartiainen and Tuunanen (2013) and Kaaronen (2014) found the similar weight results concerning this theme. Furthermore, only 3,35% of all chains was recorded under this stimuli theme. However, consequence bundles such as *Feeling meaningful by gaining social and self-reward* (eighth largest consequence class), *Can take contact to other users value categories* (ninth largest consequence class),

and less popular *Can make friends, and Can get to know and identify other users,* indicate that this CIS's value proposition element is important topic, yet the service users do not recognize it as such, or at least they mix it with another, one (e.g. more general *Social nature of use*). Among the values following ones; *Social relationships and identification* (the second largest value class), *Respect, appreciation, encouragement and recognition* (sixth largest value class) and *Helping others and sharing things with them* (12th largest value category) may be linked to this construction of identities topic. Additionally appearance of many self-esteem oriented value categories, such as *Feeling competent* (11th largest value class), *Thirst for information* (the second largest value class), and *Learning* (7th largest value class), suggest that actually *Construction of identities* is a compound thing that is overlapping with all those above values.

There are many alternative reasons for this finding; *first reason* may be that people do hesitate to reveal intimate goals. *Second explanation* for it may be that it's being interpreted wrongly due to element's naming (one participant snorted when talked about construction of identities), which seems to be ridiculous and in some way shameful goal for someone. *Another reason* may be that the people do not find picking up this theme helpful, as there are better and more descriptive ones, e.g. *Goals and outcomes and Social nature of use.* Both of these in a way could include the idea of *Construction of identities*. Therefore the implication is that despite of the fact that the Construction of identities element seems not to be independent value proposition class of find database, it can be so along within *Social nature of use*. Based on the finding, that there was plenty of other self-esteem and social related values, this study suggest that *Construction of identities,* namely identity building through the service consumption, is important reason to participate for many; *Construction of identities* element has some similarities with values aggregated under *Self-esteem and learning* value category. However, despite of the fact it is one of the key drivers behind the find database use, it is so tacit one so it does not pop up. Therefore solution to this may be to rename this element differently *Self-esteem and confidence* include it to the *Social nature of use* element. This would potentially help avoiding the miss-interpretation of participants choosing the stimuli, and thus to attract more weight upon this theme too in future data collection projects.

8.6.2 Value drivers in comparison

As with CIS's customer value driver elements, the first namely *Service process experience* has its counterpart in the findings of this study. Furthermore, it as third most popular stimuli theme with average (16,67%) weight as chosen primary theme. However, *Experiences and enjoyment* is the sixth important value driver class of the find database; furthermore *User experience, usability and ease-of-use* was the sixth important value category. Corresponding *Experience & enjoyment* value bundle was the fifth largest value bundle of all. The implication from here is that this study confirms that CIS's value driver element *Service*

process experience deserve its place among top 6 aspects of consumer information systems use.

However, as discussed earlier on, this experience topic is better reasoned as possible hindrance than actual driver; as it is not likely noticed until it has been managed poorly. As discussed earlier, it is rather instrumentally important than ultimately important. As Tuunanen et al. (2010) put, the experience need to aim at less frustration for the users. Väänänen-Vainio-Mattila et al (2010), and Hassenzahl (2008), and Pilke, (2004) have found that experience itself is not ultimate goal for many, but rather as possible hurdle and hindrance toward fulfilment of some other goal. Therefore this study suggests it's rather system value proposition than a end-user value driver. Consequently it's good to ask, whether *Service process experience* should be depicted to the value proposition side of the CIS framework, rather than value driver side of the split. Besides being important value proposition, this one can be considered also *as a critical success factor of consumer-based information system development.*

As for *Goals and outcomes*, as results show it is the most preferred stimuli theme (37,50% chose this as primary stimuli theme). Moreover, almost one third of all chains were discussed below this stimuli theme. Although it was the most preferred stimuli theme, it has a special problem compared to other CIS's elements; a majority of all other value driver classes could actually be a sub categories to this element, such as: *cognitive goals and needs (learning), personal & social integrative goals and needs (self-esteem, sociality), and affective goals and needs (experience and enjoyment)*. So being so unspecified no it's difficult to confirm anything about this Goals and outcomes element. Good side of using this element as such as stimulus in interview is that it sparks discussion on any kind of goals and outcomes, which may also be reason why it was most chosen one as stimuli. This is good thing for the data collection, and perhaps a bad thing for the coherency of CIS classification.

The implication is that rather than using Goals and outcomes as a joker card in interview, an extra answering option (i.e. "tell freely about any of your goals or needs") could be offered. Therefore the data collection for validating the classification of actual end-value drivers would not be distorted and biased. This study findings also raise a suspect whether this element is yet polished so that it's equally important with other driver elements of CIS. This study has already used Uses & Gratifications theory to classify end-user goals to certain coherent and meaningful classes. As shown in the below figure (Figure 14) Goals and outcomes is a label of actual value drivers of end-users.

With regards to *Participation in service production,* this element was the second popular stimuli theme (with 20,83%, i.e. slightly over weighed). From the viewpoint of stimuli distribution data, this theme was significantly overweighed to the fact the *Participation* value was not among top 10 significant values; moreover *Participation* value category was not better than 17th of all value categories. The results suggest that there's is no a corresponding driver or value bundle for this CIS's element. To discuss about a possible reasons for that; plenty of sociality related values discussed under this stimulus theme may in-

dicate that there's conflict between the reasons the participants chose this Participation theme and the value pattern they have; *people may have felt they will likely use the find database, so they might have perceived this category important to them*. In other words, they indirectly messaged: *"Yes, we are interested to use this service"* and therefore they end up choosing this theme. Other possible reason is that Participation is so general concept that it covers many other subtle aspects. Therefore, any sort of activity taken in the community type of activity can be seen as a participation. However, as the findings suggest, the most of the participants did not felt that the participation itself would be the end goal they pursue toward, therefore the implication is that this study does not support the idea that *Participation in service production* is one of the three most important customer value drivers.

Despite of the findings, yet, every serial scientists and practitioners acknowledges that especially participation to the service production (and development) is crucial thing for the service success. Added the fact that CIS was originally the development framework, so this element may be a design aspect. This may explain why it does not cause any resonance among end-users as a value driver. To conclude, this study suggests that this CIS's element could rather be understood rather as *a success factor of digitized service innovation* rather than customer value driver. Sometimes it may work also as a value proposition, but this field data does not support that.

8.6.3 Value co-creation in online community consumer information systems

In this chapter literature review findings (Figure 3) and the field study findings (Figure 13) are put together with the current CIS system value proposition and customer value driver elements. The resulting split is visible below (Figure 14).

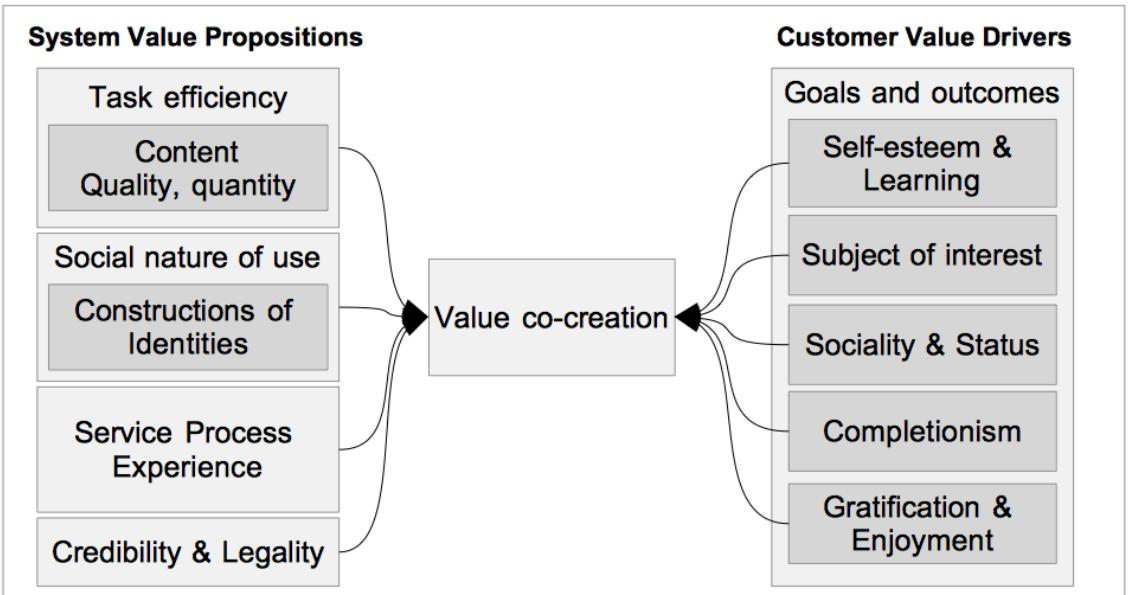


Figure 14 - System value propositions and customer value drivers of find database online community

Upon findings of this study, three of six CIS's elements namely Social nature of use, Goals and outcomes, and Service process experience received support from the field study data of this research paper;

Social nature of use was amongst the third most important consequence classes in the OC literature findings (Figure 3) as well as findings from the field study data (Figure 13). Additional to CIS's current classification, in which this element is not present at customer value driver side, this study further suggests that Social nature of use is not just important system value proposition, but also important customer value driver of find database. This implication is based on the findings that Social Integrative Needs were considered as one of five important driver classes also in the U&G theory, and that Sociality & status was the third largest value bundle aggregated from the dataset. Therefore, it was added to the value driver side labelled as Sociality & Status.

With regards to *Goals and outcomes* element, this study suggests that from the current CIS's driver elements, only Goals and outcomes can be considered as a pure driver element of the find database, or at least general label for those specific value drivers which are unearthed in this study. Therefore it was placed as a label for all the rest of the value driver types to the rights side of the value co-creation formula. Other more specific value driver types are self-esteem & learning, subject of interest, sociality & status, completionism (task efficiency) and gratification & enjoyment. These classes are widely consistent with the field study findings of actual end-user value driver bundles (Figure 13), but also findings of the online community literature review and U&G theory classification (Figure 3). U&G theory included personal integrative needs (i.e. self-esteem), cognitive needs (learning), affective needs (gratification & enjoyment), social integrative needs (sociality & status), and finally tension release needs (gratification & enjoyment). Those are the needs and goals, which are driving users toward consumption in the find database use, as the field study data suggest.

Service process experience placement to the value proposition side is reasoned by the findings of OC literature review and the field study as well as by the OC literature review findings; former revealed that Experience and Enjoyment was the fifth most important consequence bundle as well as fifth important end value driver in the field study dataset. Latter revealed that Usability and System quality, which can be considered as a key determinant to positive service experience, is important system value proposition of an online community (Figure 3). Additional reason why it has been placed in the value proposition side is that its current naming pertain particularly to service provider's side, thus its labelling indicates it being more a value proposition. Nevertheless, according to literature, it seems to be desired consequence, and important end-value driver too, but also instrumental in nature as it helps other important values to turn into reality, as other studies also suggest. This makes it possible to put it to the value proposition side as well. Plus, there's already a driver element, which is more definitive concept capturing the end reason why people aims at experiencing process positively; it is Gratification & Enjoyment. This is

to say, that people want to feel good service experience as they like feelings of gratification and enjoyment, which results from a good service process. In addition, the latter is much more suitable name for driver and need of customer.

It was also suggested that *Construction of identities* is rather part of Social nature of use element than an independent element - if this element is considered as an independent value proposition at all. The rationale behind this suggestion is that Construction of identities can be considered to be part of the Social Integrative Needs, and thus it's already in the driver side of the split as part of Sociality & Status driver element. On the other hand, if it's needed to be an independent value proposition (which is not indeed supported by the field study findings as stimulus weights reveal), so it could be placed within Social nature of use, as building identities is in nature very social activity. As already posited, the weights this gained do not support that it's important distinct value proposition element. Therefore this study suggests that its natural place is within Social nature of use element in the system value proposition side. *Nevertheless, due to the complexity of this concept, only thing which is sure, that more research need to be done concerning this element.*

Furthermore, as it was previously discussed, *Context of use* and *Participation to the service production* did not gain support from the OC literature review or field study data as an important find database value propositions or as customer drivers. Thus these CIS's elements were left out from the above table (Figure 14). To incorporate them to the service development framework, another table could be accompanied; it could assemble all success factors for consumer-based digitized service development.

The rest of the value proposition elements are as follows:

Task efficiency includes content and information quality and quantity. Findings from both OC literature and the field study suggest that valid content (both in terms of quality and quantity) is - if not the most important value proposition of the user-made content driven information intensive online community – it's at least the second most significant value proposition of them. Especially in the find database context, quality of information is also strongly linked to task efficiency; the better information, the faster the finds can be identified and more time saves can be gained. The field study results suggest that task efficiency and fast completion of tasks was significantly the most important single initial reason for many users to participate (Figure 13). Yet, OC literature findings do not support this finding. Reason for this may be that many online communities studied were not so task-oriented in nature compared to the find database. Actually, most of the studies covered leisure and hobby communities, in which task efficiency may not play in such significant role.

Finally, a completely new element to value proposition side is suggested; namely *Credibility & Legality*. It refers to trustworthiness (it's safe and secure to use), credibility and legality of the service provider and the activity. These issues found out to be averagely important factors whether users felt trust toward the system based on the field study. As these themes seems to be more instrumental in their nature i.e. they're perhaps noticed until they are not pre-

sent and taken well, and they were not a top three important ultimate value drivers to participate to service use, *these groups could be considered rather a hindrance type of system value propositions and not actual end-user value drivers*. Hence Credibility & Legality was placed to the system value proposition side. This also suggests that it's up to service provider to provide indication that the activity is following laws and it's thus legal and trustworthy. Thus, it 's one of the minor value propositions of the service.

To conclude description of above figure (Figure 14), this study suggest that this new split of value co-creation elements is *especially suitable for those consumer information systems which operate in information intensive, user-generated content driven and task-oriented domains.*

8.7 Implications for the research

In this chapter the implications of findings are discussed. First the implications concerning the research questions 1 and 2 are being discussed to proceed then to implications of the main research question.

8.7.1 Both utilitarian and hedonic aspects are driving behavior

As with implications for research, firstly the study suggest that find database use is initially motivated by utilitarian reasons and ultimately driven by both hedonic and utilitarian drivers. This study implicate that especially services which facilitate information intensive learning and goal-oriented activities, and which are driven by user-generated content and social interactions, tend to lean towards rational value assessments rather than hedonic assessments. This implication is basing on findings of previous studies accompanied with findings of this study. Such services are as follows: mobile financial services (Peffers & Tuunanen, 2005), e-learning service (Tuunanen and Govindji, 2011), organizational event promotion services (Kaaronen, 2014) as well as metal detecting find identification activity (the major utility of find database).

This study implicate that still the *majority of the studied services are goal-oriented, non-experimental activities and often rational values are important at least in their instrumental meaning to reach more hedonic values.* Yet, basing on the current understanding, values revolve around hedonic and utilitarian gains depending a lot of the type of service, context, task being completed, and user groups of the service.

8.7.2 New research is needed in terms of success factors and value co-creation elements

This study implicate that CIS six elements include some *success factors of digitized service development* (Context of use, Participation to the service production, and Service process experience), *system value propositions* (Social nature of use, Construction of identities, and Service process experience) and *customer value drivers* (Goals and outcomes).

Furthermore, as above implicated, CIS meaning for service innovation have been interpreted often as a suggestion and sort of ”a hypothesis” of important value driver (or propositions) class of end-users. This sort of CIS use seems neither to be the way it was meant originally to be used (as it was a collection of critical success factors and aspects and challenges of digitized service development) nor it's recommendable any longer, as the field studies constantly bring up evidence that the current suggestion of CIS's value propositions and customer value drivers is not a fully balanced. As it was discussed, perhaps due to that wide diversification of the CIS’s elements, some of the elements are constantly being over and some under weighted to the average in studies (Vartiainen & Tuunanen, 2013, Kaaronen 2014) as well as this study.

Therefore this study suggests that to get more balanced results in future CIS research projects, CIS's current split of system value propositions and customer value drivers should be further iterated. Yet, three of six CIS's elements namely; *Social nature of use, Goals and outcomes*, and *Service process experience* were confirmed by the field study data of this research paper.

To sum up, the findings of this study supports the idea of authors of CIS framework, who admitted that current framework does not cover all aspects of value co-creation (Tuunanen, et al. 2010). To contribute this topic, this study suggested a new draft split for CIS's system value propositions and customer value drivers (Figure 14), which may be particularly suitable *especially in task-oriented information sharing online communities, such as a find database*. Which is sure is that there is a room for further work to further refinement of universal service system value propositions and customer value drivers, in which this study has made an initial contribution (check Figure 14).

This study suggest that in future CIS framework could be specified *to be either illustration of system value propositions of consumer based services,* or CIS could focusing on *depicting the success factors of digitized service design together with guidelines how they should be interpreted.* It cannot be both at the same time.

8.7.3 Positive service experiences are not based only in ease-of-use and minimizing frustration

As discussed, service process experience seems not be among the most important three value drivers of the find database; it's rather possible cause of frustration and hindrance. This finding opens up the discussion of how should service

success be measured, if not using traditional usability perception; the concept of flow is often linked to service research, and measuring positive experiences, as was discussed. No wonder as users falling in flow state are likely more motivated to use service than those who are anxious or bored. According to Chen and Nilan (1999) Csikszentmihalyi, a coiner of flow concept described flow as follows: "Flow seems to be an engine of evolution propelling human beings to a higher level of complexity (Csikszentmihalyi, 1993,p.197)." Chen and Nilan (1999). This study has shown that ultimate goals driving people using find database online community is often linked rather *learning, building positive self-esteem, and managing social networks* than pure usability and service experience. Instead of making the experience flow as easy as and as uncomfortable as possible, the flow is likely occurring when one is reaching some of the ultimate *purposes and aspirations* such as *self-esteem & learning, learning and civilization, and gaining new skills* rather than making the process as convenient as possible. This indicates that state of flow is likely stemming from the ground of suited *challenges* and *possibilities to grow*, and odds to reach going *beyond the limits* in the *complex and uncertain* environment.

What is the implication? Perhaps thus the existence of so numerous ugly-looking yet highly popular online communities and discussion forums discussed in the online community chapter, indicates that service success is not always dependent on aesthetics, beauty, or even functionality; rather service success seems to be linked to deeper meaning of enabling humans to strive towards higher level of complexity, as defined in the concept of flow by Csikszentmihalyi (1993). Perhaps the ultimate success of service is more dependent on offering *suited challenges*, *cognitive loads*, and *intrinsically interesting tasks*, not to forget the *environment* where one can try reaching or even going beyond limits.

Therefore this study posit that success of online communities, especially those information and task-oriented ones driven by socially created contents, may be based to the fact that they support these inner meanings of flow and thus they foster emergence of such positive flow states and help human to reach to a higher level of complexity.

8.8 Implications for practitioners

This study besides focusing on validating the CIS framework, suggest that designing compelling value propositions is a core task of IS practitioner along the way to building successful information system or web service. It is also noticed that development of rich features for contemporary IS set high requirements to planning methodologies. This study has used successfully Critical Success Chain methodology and produced features for managerial work of the find database development. One major implication this study set is that value propositions pertain to certain estimated impact what customer can expect from using the features. Therefore the value propositions design must be based on the data

concerning the desired consequences of end-users, for it's the best knowledge of how features lead to fulfilment of certain values and goals.

8.8.1 Critical Success Chain's feasibility for new service design

This study has exemplified the use of the Critical Success Chain (CSC), contemporary methodology in development of value propositions and rich requirements. This study implicates that CSC is feasible methodology for requirement engineering projects aiming at producing rich insights on designing compelling service value proposition and feature offerings.

8.8.2 Utilitarian needs to be covered in service design

This study suggested that the find database use is initially a goal-oriented and pragmatically assessed activity, and ultimately driven by both utilitarian and hedonic value assessment. The initial reasons to use service were often efficient task completion, such as identifying finds, being able to socialize to reach own goals, and to make contribution to history research and preservation of cultural heritage. These initial reasons were often serving the ultimate drivers, such as interest in history research and archaeology research, self-esteem related information acquiring and learning and getting respect, as well as social relationships and identification.

Therefore the study suggest that taking care of proper socializing tools in the design of find database, may help the users reaching more important values such as learning, self-esteem and history research aspiration. This study suggested, that experience side pertain to system usability, searching functions, and ease-of-use, so to avoid experience to become a hindrance of user experience, these issues to be tackled appropriately. The system functionality, and to means to foster content creation is been noticed as serious hindrances at worse, if not coped with seriously.

8.8.3 Quality information, searching tools and ease-of-use

As for fulfilling *interest in historical things* and to *do history research*, offer lots of find information attributes, and excellent searching tools, as well as good usability, guidance and content representation functions. Also communication functions were important from viewpoint of that value. In order to support users carrying out tasks *more efficiently* and saving their time, the searching functions, usability and guidance, and content presentation cluster to be offered to deliver on that need. Moreover, tools to registering finds to database easily and suited aids to complete find identifications and acquire better quality of information were to be considered as means.

As the end-users liked much *quality of information*, additional to identification mechanisms, a mobile version of the database were to be offered as well. Mobile version was strongly linked to contributing toward better quality of information, as the participant who suggested it thought they would get more precise information once reported directly from the spot. As with *quantity of information*, an excellent communication means, and multitude of information attributes as well as identification tools were most often associated to that end.

From the point of view of *the self-esteem* related topics, such as learning, thirst for information, respect, independency and solving problems, lots of find information, assistance in identification, communication tools, and searching tools features were suggested. Also incentives and rewards were associated also to that value.

From the perspective of *sociality and status*, especially the communication features were seen important. Also offering suited means to set up a user profile with personal styles, anonym registration, and to adjust privacy and content sharing settings was considered supporting this end. As with the *credibility*, a content sharing and privacy adjustment settings were significantly the most important feature to be offered. Also communication means increased trust perception.

To fulfill *experience and enjoyment* related needs concerning find database use, the searching functions appeared to be the most important single feature cluster. Nonetheless, important was also general usability, guidance and suited content representation forms and easy-to-use instructive information adding and editing tools. These three aspects were tightly linked to the functionality of the system.

Finally, *interest toward the activity* was most facilitated by offering an accurate information of finds, easy-to-use content adding features, and means to help in find identification tasks.

9 Concluding remarks

In this chapter the study's conclusions are being presented with final remarks. Firstly the research is summarized and each the study objective and the answers are being put together. The main contributions to the academia and the industry are presented in short. Finally the limitations are discussed and the future directions are set.

9.1 Summary of the study

This study approached the issue of online community based consumer information system value proposition and end-user value driver issue through systematic exploration of the space of IS, service and online community literature and conducting also an extensive field study. To produce new insights from the phenomena of metal detecting, yet rather unknown, this study used the CIS development framework (Tuunanen et al., 2010) as a study lens along with a suggested participatory methodology labelled as Critical Success Chain. The interpretive case study employed laddering interview with open-ended questions (n=24), to extract value structures of metal detecting hobbyists and museum professionals. The aim of field study was to explore this unknown social phenomena to find key value drivers and thus derive the key system value propositions the find database to offer. This was to help justifying the features for the services, and more importantly, to contribute to deriving universal value proposition classes for information intensive and goal-oriented, user-made content driven social web services. As for main study goals, the research objective was to test the CIS's current system value proposition and customer driver hypothesis and thus to shed further light on consumer based information systems and web service research.

9.2 Main academical contributions

As for the research results, the study suggest that the find database activity is initially driven by following reasons: *saving time* and *gaining work and task efficiency*, to produce positive impact on *history research* and *history preservation,* and being able to *interact other hobbyists*. Upon the field data, the database use is ultimately driven by aspirations related to: *history and archaeology research*, *self-esteem and learning*, and *sociality and status*. As for value propositions to match on those value drivers, *time and effort savings, quality and quantity of content, new friends and contacts, credibility, experience and enjoyment* as well as *other rewards* were suggested. As for delivering on those needs in terms of feature offerings, *high quality of contents of interest*, *searching functions* and *mechanism to support identifications of finds* and to *validate information* were suggested.

As with the major implications of this research, firstly the find database use is initially motivated by utilitarian reasons and ultimately driven by both hedonic and utilitarian drivers. This study seems to be in line with previous findings; this sort of information sharing and learning oriented activity has been seen primarily motivated by pragmatic gains. Similar findings are made earlier concerning mobile financial services (Peffers & Tuunanen, 2005), e-learning service (Tuunanen and Govindji, 2011), and organizational event promotion services (Kaaronen, 2014). Hence, it seems that especially in information intensive learning and goal-oriented activities, the drivers are often rational in nature and hedonic drivers play a minor role.

Secondly this study suggest that CIS's six elements seems to be a mix-up of *success factors of digitized service development* (Context of use, Participation to the service production, and Service process experience), *system value propositions* (Social nature of use, Construction of identities, and Service process experience) and *customer value drivers* (Goals and outcomes). This wide diversification of elements may explains why there's constantly certain over and under weights on certain elements of CIS in recent studies (e.g., Kaaronen 2014, Vartiainen & Tuunanen 2013). Therefore this study suggest that to get more balanced results in future, CIS current split should be further considered and perhaps updated. This study started a job and iterated a system value propositions and customer drivers illustration (Figure 14), which is applicable especially for *information intensive, user-made content driven, task-oriented and social online community web services*. In it, customer value drivers consists of value propositions such as: *Task efficiency* (incl. Information quality and quantity), *Social nature of use* (incl. Construction of identities), *Service process experience* and finally *Credible governance*, which refers to trustworthiness, credibility, legality of the service provider and the activity. Concerning value driver side, this study suggest that CIS's current element namely *Goals and outcomes is just a label of actual customer value drivers; thus this study suggest that self-esteem & learning, subject of interest (e.g. History research), sociality & status, completionism and gratification & enjoyment.*

It was also posited that that CIS as it stands currently does not make a clear distinction of what each elements are meant to be and how they should be

used. Therefore this study suggested that to get more balanced results in future CIS research projects, CIS's current split of system value propositions and customer value drivers should be further iterated. Another derivation is therefore that there might be a room for further work to further refinement of universal service system value propositions and customer value drivers, in which this study has made an initial contribution (check Figure 14). This study suggested also that in future CIS framework could be specified *to be either illustration of system value propositions of consumer based services,* or CIS could focusing on *depicting the success factors of digitized service design together with guidelines how they should be interpreted.* It cannot be both at the same time.

This study added also to the knowledge of online community research; it defined the concept of online community and as a result of literature research it listed existing value proposition and offerings. Drawing on this study, there's now an illustration of a co-creation elements to be used to study further information intensive and task-oriented online communities (Figure 3).

This study has also contributed to research of metal detecting hobby. It has pinpointed the key motivational factors of hobbyist toward discovering finds. As for contributions to existing research of metal detecting hobby, this study is consistent with existing study; similar results concerning the main motivation factor of metal detectorists toward the hobby was found by Thomas (2012), as for 54,4% her respondents stated 'interest in the past' motivating them. Money was seen least significant driver in both studies.

9.3 Main practical contributions

The main practical contribution this study did was the deliverable of proponent end-user value drivers (and feature offerings) and system propositions documentation for the find database development.

Following value propositions were formulated for the find database online community put order as per importance;

- *"Get your find identified immediately while helping in finding fixed relics and support the history research and protection of cultural heritage",*
- *"Learn in social manner using high quality searches and results from the largest database of hobbyists-made finds",*
- *"Share hints and experiences with others, find other like-minded people or project members here - and contribute positively to hobby!"*
- *"Protect and share finds in a responsible and secure way!" and finally*
- *"Easy and enjoyable way of documenting and storing finds."*
- *"Improve fit and gain money"*

As with offerings to deliver on the needs, goals and values of end-users, the study suggested nine feature clusters for the consideration of the find database project organization. Following feature themes were suggested; As for fulfilling

interest in historical things and to do history research, the find database should offer lots of find information and related attributes, excellent searching tools, and good usability, guidance and content representation functions. Also communication functions were important from viewpoint of that value.

In order to support users carrying out tasks more efficiently and saving their time, the searching functions, usability and guidance, and content presentation cluster to be offered to deliver on that need.

As the end-users liked much quality of information, additional to identification mechanisms, a mobile version of the database was to be offered as well. Mobile version was strongly linked to contributing toward better quality of information, as the participant who suggested it thought they would get more precise information once reported directly from the spot. As with quantity of information, an excellent communication means, multitude of information attributes as well as identification tools should be offered.

From the point of view of the self-esteem related topics such as learning, thirst for information, respect, independency and solving problems, the find database should offer lots of find information, assistance in identification, communication tools, and searching tools.

From the perspective of sociality and status, especially the communication features were seen important. Also offering suited means to set up a user profile with personal styles, anonym registration and to adjust privacy and content sharing settings was considered supporting this end. To increase credibility, a content sharing and privacy adjustment settings should be offered.

To fulfill experience and enjoyment related needs of end-users of database use, searching functions, as well as general usability, guidance and suited content representation forms and easy-to-use instructive information adding and editing tools should be offered.

9.4 Limitations of the study

This study approached the online community based consumer information system value proposition and end-user value driver issue through systematic exploration of the space of IS and service literature and conducting also an extensive field study. It managed to answer to the research questions and provided with detailed considerations for further research of CIS. Yet, as any large studies also this research one has its limitations. Some of them are common especially to interpretive research approach.

With regards to recruitment process, there's no guarantee that the selected participants group represent lead users or early adopters, nor no-one knows to what extent these users differs from a majority end-user group and how this sample represent a wider population. Literature suggests that especially involving lead-users and early-adopters is crucial for success of the project (von Hippel, 1986).

This case research employed 24 interviews, which is less than the original ideal number of 30 interviews to ensure getting representative sample and sufficient data for the analysis (Peffers et al., 2003). However, later on Peffers and Tuunanen (2005) admitting that social sciences has found that the number of 15–30 participants is sufficient to produce nearly all of the ideas. It's fair to say that this study did not suffered too little of data. Therefore no any major flaws due to the number of interviewees should have caused.

As for geographical locations of the participants, they represented only a Finland, which means this study offers a domestic perspective to the find database and metal detecting phenomena.

With regards to interview process, some of the interviews got quite flourishing jumping rapidly from one topic to another, which may have caused bias to representations of some of the bilateral relationships of consequences. Due to this reason, it's wasn't always a clear what were the chronological order of consequences mentioned. This may cause bias to the order of consequences represented in the network maps.

As aforementioned in the methodology reasoning, it's noteworthy that Critical Success Chain methodology causes a significant risk of analyst bias (Peffers et al., 2003). Especially during the thematic analysis, and clustering processes, the decisions are made based on the analyst's subjective understanding and knowledge as to the topics. It's also noteworthy that over the course of the study, a multiple of interpretation layers emerges on top of each other's. For example interviewee and analyst may differ from each other as for the meanings and associations linked to concepts used. Yet, being at the same time the limitation and strengths, it's the very nature of the interpretive study. As a positive stance, it resulted in a lively image of this human phenomena.

Additionally, this study did not used Ward's method (Aldenderfer & Blashfield, 1984) to minimize the variance of the constructs in each feature cluster (Peffers and Tuunanen, 2005). This study used only one analyst, which may increase risk of bias caused by having single analyst in interpretation, which was suggested by Peffers et al., 2003.

As with the amount of interview data, the coding features, consequences and values must have caused some information loss during merging and relabeling themes. This is however needed to make abstractions out of the detailed dataset. To tackle excessive data loss and to ensure the widest possible access to original ideas of the participants, the final consequence and feature categories were labelled in a manner, which ensure the great variety of different things assigned to each category. This ensures that no white-and-black sort of implications from the findings is made. For the sake of transparency and access to original information, the final clustering of consequences and values was made transparent by representing the ingredient units of bundles.

What has become evident in this study, although the stimuli descriptions were constructed with a piety to reflect the original ideas of meta theories, the CIS's *Context of use stimuli* theme was chosen by the participants predominantly due to a word of mobile application in its description. Other recent studies have

found that stimulus has large impact to the results gained. Kaaronen put it ”The relative weakness of some stimuli themes over another may also cause stronger themes to being referred to more often than the weaker ones.” (Kaaronen, 2014). Govindji (2008) admitted that a phrasing of the stimuli have influence over the ideas extracted. So stimuli creation stage is exposing the study to another potential source of analyst bias, as in some cases participants end up suggesting ideas mentioned ideas in stimuli themes. This limitation is linked generally to the issue of how CIS should inform the field study. The analyst bias through stimuli creation may be basing on the thing that many participants might have lacked capacities to draw conclusions and suggest new innovative ideas upon self, so they have relied strongly on the stimuli themes.

Concerning the theoretical parts, OC literature review value proposition, value driver and feature offering results should not be considered too narrow-mindedly. Those ideas are collected from a chunk of papers varying greatly in quality, approach, and purpose. Often they were collected in rush. Often an interpretation was used, and some of the concepts were merged to put them in one form. So as per cites to original papers, there might not be exactly similar construct used. If the results are used in further studies, the original papers are recommended to be read. OC literature review is meant to offer only inspirational surplus.

9.5 Future research directions

This study approached the issue of testing current CIS's hypothesis of consumer information system's value propositions and its end-users value drivers in the context of information intensive and task oriented find database online community. The implications show that there’s some future research topic that deserve academic attention;

First this study point out a need for further exploration of value cocreation elements (i.e. system value propositions and customer value drivers) of consumer information system based web services, as well as other types of online communities. Especially it’s interesting how the type of the activity done affects to the customer value drivers and system value propositions; this study found out that especially user-made content driven, information intensive and task oriented activities still depend a lot on how the service support content quality and quantity and task efficiency. Therefore, it could be interesting to research, what types of online communities and services exist in terms of nature of activity, and what are the value co-creation elements of each.

Secondly, this study pinpointed a need for further research of critical success factors of consumer information systems and digitized services. It was suggested that CIS’s elements Participation to the service production, and Context of use are actually critical success factors of digitized service development. This work should definitely be continued.

Furthermore, as it was discussed concerning CSC methodology and service science, there's still work to be done to further define the path to designing value propositions and unearthing customer value drivers; literature has suggested that techniques (such as Critical Success Chain) should be further developed and new knowledge concerning design methods and tools should be developed (Ostrom et al., 2010, Tuunanen et al., 2010, Govindji, 2008). This study has shown that CSC is a good starting, as it is specialized to pinpoint value structures using subsequent why questions. Ostrom et al. (2010) has called attention for following priority; ”Generating, prioritizing, and managing service innovation ideas” (Ostrom et al., 2010). This important topic has been stressed by Lean philosophy (Ries, 2011), as well as Organizational IS literature (Peffers et al., 2003). CSC could have lots to learn from Lean thinking.

Other relevant questions, that could be assessed in future research projects are as follows: *How to improve CSC being a more lighter and approachable for industrial or new start-up IS practitioners? How to increase amount of interaction in the requirement elicitation stage to avoid communication related flaws? How to use the methodology of CSC and other such as; focus groups, brainstorming, and ideation workshops in combination? How should these methodologies be enhanced to support elicitation of unconscious and even undreamed requirements, or should new techniques be developed?*

As for incremental and radical service innovation, one of the priorities of service science was ”Designing emergent and planned processes for incremental and radical service innovation” (Ostrom et al., 2010). This study deem that it might be of great help for CSC studying current hot trends of Lean Startup (Ries, 2011) and agile IS development to cope with the issue mentioned as to streamlining the CSC methodology towards iterative requirements gathering method; current best practices indicate that time of linear requirements gathering and IS planning is past. This would benefit CSC methodology to be more resource-wise through increased interaction between service provider and customer it would provide more sustainable requirements.

As for topic of radical innovations, CSC methodology may lack some capabilities for radical innovation and transformative innovations; CSC methodology inherently presumes the end-users know what they ultimately need. This may not be based on reality; it's often heard from the service innovators that people do not know what they want (clause often linked to Steve Jobs). Should service attempt to fulfilling existing needs of consumers, or finding new areas of unconscious or even undreamed needs (Robertson, 2001)? How could these unconscious and undreamed ideas be provoked to be unearthed? Is the answer *Group elicitation methods*, such as *Brainstorming* (Robertson, 2001), *Focus groups* (http://en.wikipedia.org/wiki/User_experience, Nuseibeh and Easterbrook, 2000), and *Ideation workshops* (Peffers et al., 2003) help bringing out these ideas out? This study insists that further studies of methodologies especially as to bringing undreamed ideas to the daylight are needed.

This study and some previous studies have shown that stimuli creation of laddering interview is influential to the as to outcomes of interviews (Govindji 2008, Kaaronen, 2014). This raises the question how stimulus are ought to be

created and used to inform the study. This topic is linked also to the question, how to uncover those undreamed requirements (Robertson, 2001) to generate radical innovations. One solution could be to further evaluate the *Brainstorming* (Nuseibeh and Easterbrook, 2000, Robertson, 2001) and *Focus group* (Nuseibeh and Easterbrook, 2000) methods as a part of CSC requirement elicitation methodology. Relevant research question would be; *How to use existing theoretical knowledge of CIS framework informing CSC facilitated field studies in requirement engineering projects?*

Although CSC methodology covers to some extent this topic, still further efforts are need to be done. The faster the service provider abandon bad ideas and re-allocate on better ideas, more likely is that the company will succeed. Thus CIS research should not only aim at prioritizing the features ideas, but also finding ways to prioritizing existing service feature packages. The question be, *could concept of flow, or similar constructs, be used to pinpoint those the most important functioning offerings? How e.g. Focus groups can be used to drive these prioritization experiments? Could Flow be formulated to heuristics for designing compelling experiences?* Additionally CIS research could focus on question, *how to generate, prioritize, and manage digitized service innovation ideas?* It's known fact in service innovation community that services which fail to focus on most crucial and favourable innovation ideas will run out of resources soon (thesis based on Lean thinking). The question of prioritizing features can be considered also one step of incremental innovation process, so it could be studied as part of innovation process research or independently as a methodological research.

As to value proposition design, this study has made a significant contribution laying a basic conceptual basis for value proposition design; the study suggested that value propositions should be designed upon desired feature consequences of critical success chain data. Yet additional study is also crucial to be done concerning value proposition design (Maglio & Spohrer, 2013). This research should tackle the following questions; *what are the incremental value proposition and service innovation steps* and *what are the drivers of sustained new digitized service success?* The former is important as there's not yet established process model for incremental service innovation combining current best practices of Design thinking, Lean Start-up, Agile development and Customer Development into one coherent framework of digitized service innovation. Latter question, namely finding the success factors of digitized services is topic, which naturally could done within context of CIS research.

Also a need to continue to refine and promote service research agendas in the IS discipline has been drummed (Ostrom et al., 2010) and Maglio and Spohrer (2013). This study suggests that development of *incremental digitized service innovation based on consumer information systems* is needed and it could be done upon CIS research. This study made a tentative work on defining the conceptual framework of value co-creation (Figure 1).

As discussed, flow concept the emerging flow status often seems to indicate chances for *personal growing* and *going beyond limits.* Therefore the suited question for service innovator is *what are the desired challenges for why people today would want to start consume any services.* Subsequently, proper means should

be developed to delivering efficiently on those certain why's, and to offer suited challenges for each sort of service customers.

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9.6 INTERNET SOURCES

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APPENDIX 1 – Value drivers of online communities with sources		
Class of consumer need	**Concept**	**Source**
Cognitive Needs	**Getting Support**	Ojala and Saarela (2010), Chennamaneni (2006), Preece and Shneiderman (2009), Lin (2010), Xiaoqing (2007), Lin, Fan, Wallace and Zhang (2007), Preece (2001), Preece, and Maloney-Krichmar (2003), Iriberri and Leroy (2009), Lampe et al. (2010), Cagnina and Poian (2009)
	Learning And Curiosity	Väänänen-Vainio-Mattila and Wäljas (2009), Väänänen-Vainio-Mattila et al. (2010), Preece and Shneiderman (2009), Ren et al. (2010), Vartiainen, and Tuunanen (2013), Cagnina and Poian (2009)
	Getting Guidance	Ojala and Saarela (2010), Väänänen-Vainio-Mattila and Wäljas (2009), Scott and Johnson (2005)
	Discovery & Exploration	Long et al. (2011), Cagnina and Poian (2009)
	Getting Feedback	Ojala and Saarela (2010)
Affective Needs	**Satisfaction**	Chen et al. (2012), Udo, Bagchi, and Kirs (2010), Tsai and Pai (2010), Lin, Fan, Wallace and Zhang (2007), Iriberri and Leroy (2009)
	Enjoyment	Chen et al. (2012), Väänänen-Vainio-Mattila and Wäljas (2009), Tsai and Pai (2010), Camponovo (2011)
	Entertainment	Tsai and Pai (2010), Wang et al. (2009), Long et al. (2011)
	Pleasure	Camponovo (2011)
	Aesthetics	Preece (2001)
	Affection	Honglei (2006)
Personal Integrative Needs	**Identification**	Malinen and Ojala (2012), Chen et al. (2012), Väänänen-Vainio-Mattila and Wäljas (2009), Väänänen-Vainio-Mattila et al. (2010), Zhou (2011). Tsai and Pai (2010), Long et al. (2011), Gutierrez et al. (2012), Iriberri and Leroy (2009)
	Commitment And Loyalty	Ojala and Saarela (2010), Tsai et al. (2012), Tsai and Pai (2010), Lin (2010), Sharratt and Usoro (2003), Gutierrez et al. (2012), Iriberri and Leroy (2009), Cagnina and Poian (2009)
	Joy Of Success	Vartiainen, and Tuunanen (2013)
	Achievements	Ojala and Saarela (2010), Montola, Nummenmaa, Lucero, Boberg and Korhonen (2009), Lu and Hsiao (2007), Vartiainen, and Tuunanen (2013), Cagnina and Poian (2009)
	Altruism	Chen et al. (2012), Dongwon et al. (2010), Tsai and Pai (2010), Preece and Shneiderman (2009), Camponovo (2011)
	Need For Control	Malinen and Ojala (2012), Honglei (2006), Zhou (2008), Unverdi-Creig, and Jackson (2012),
	Self-Expression	Malinen and Ojala (2012), Väänänen-Vainio-Mattila and Wäljas (2009), Väänänen-Vainio-Mattila et al. (2010), Dongwon et al. (2010)
	Self-Esteem	Camponovo (2011), Bo et al. (2012), Sangwan (2005)
	Feel Of Competence	Camponovo (2011), Parasuraman et al. (1985), Sharratt and Usoro (2003)
	Feel Of Power	Chennamaneni (2006), Preece and Shneiderman (2009), Honglei (2006)

	Feel Of Obligation	Ojala and Saarela (2010), Tsai and Pai (2010), Camponovo (2011)
	Credibility	Ojala and Saarela (2010), Parasuraman et al. (1985),
	Self-Disclosure	Ren et al. (2010), Cagnina and Poian (2009)
	Autonomy	Malinen and Ojala (2012),Camponovo (2011)
	Feel Of Worthy	Camponovo (2011)
	Challenging Oneself	Vartiainen, and Tuunanen (2013)
	Domination	Cagnina and Poian (2009)
	Completionism	Väänänen-Vainio-Mattila, and Wäljas (2009)
	Progress	Cagnina and Poian (2009)
	Pride About Accomplishments	Preece (2004)
	Provocation	Cagnina and Poian (2009)
Social Integrative Needs	**Social Interaction**	Malinen and Ojala (2012), Ojala and Saarela (2010), Cho (2011), Väänänen-Vainio-Mattila and Wäljas (2009), Chennamaneni (2006), Dongwon et al. (2010), Wang et al. (2009), Shipps and Phillips (2013), Bo et al. (2012), Honglei (2006), Sangwan (2005), Xiaoqing (2007), Gutierrez et al. (2012), Preece (2001), Iriberri and Leroy (2009), Lampe et al. (2010), Ren et al. (2010)
	Recognition	Malinen and Ojala (2012), Ojala and Saarela (2010), Chen et al. (2012), Väänänen-Vainio-Mattila et al. (2010), Tsai and Pai (2010), Preece and Shneiderman (2009), Camponovo (2011), Bo et al. (2012), Scott and Johnson (2005), Lin, Fan, Wallace and Zhang (2007), Gutierrez et al. (2012), Iriberri and Leroy (2009)
	Sociability	Malinen and Ojala (2012), Ojala and Saarela (2010), Väänänen-Vainio-Mattila and Wäljas (2009), Preece and Shneiderman (2009), Long et al. (2011), Dong (2009), Lin (2010), Spagnoletti and Resca (2012), Gutierrez et al. (2012), Preece (2001), Preece, and Maloney-Krichmar (2003), Cagnina and Poian (2009)
	Reputation	Malinen and Ojala (2012), Ojala and Saarela (2010), Chen et al. (2012), Chennamaneni (2006), Preece and Shneiderman (2009), Long et al. (2011), Bo et al. (2012), Zhou (2008), Preece, and Maloney-Krichmar (2003)
	Reciprocity	Väänänen-Vainio-Mattila et al. (2010), Tsai and Pai (2010), Camponovo (2011), Preece (2004), Ren et al. (2010), Preece (2001), Preece, and Maloney-Krichmar (2003), Hernandes and Fresneda (2003)
	Communication Needs	Malinen and Ojala (2012), Ojala and Saarela (2010), Dongwon et al. (2010), Bo et al. (2012), Preece (2004), Lin, Fan, Wallace and Zhang (2007), Ren et al. (2010)
	Social Status	Malinen and Ojala (2012), Ojala and Saarela (2010), Montola, Nummenmaa, Lucero, Boberg and Korhonen (2009), Long et al. (2011), Cagnina and Poian (2009)
	Interpersonal And Social Relationships	Camponovo (2011), Bo et al. (2012), Honglei (2006), Vartiainen, and Tuunanen (2013), Cagnina and Poian (2009)
	Social Identity	Malinen and Ojala (2012), Zhou (2011). Dongwon et al. (2010), Gutierrez et al. (2012)
	Making Friends	Väänänen-Vainio-Mattila and Wäljas (2009), Preece and Shneiderman (2009), Cagnina and Poian (2009)
	Competition	Montola, Nummenmaa, Lucero, Boberg and Korhonen (2009),Cagnina and Poian (2009)
	Challenging Others	Vartiainen, and Tuunanen (2013),Cagnina and Poian

		(2009)
	Helping Others	Cagnina and Poian (2009)
	Approval	Camponovo (2011)
	Inclusion	Honglei (2006)
	Relatedness	Camponovo (2011)
	Collaboration	Cagnina and Poian (2009)
Tension Release Needs	**Process Experience**	Chen et al. (2012), Väänänen-Vainio-Mattila and Wäljas (2009), Udo, Bagchi, and Kirs (2010), Long et al. (2011),Shipps and Phillips (2013), Dong (2009), Robert and Duncan (2012)
	Relax	Long et al. (2011), Lampe et al. (2010), Cagnina and Poian (2009)
	Escapism	Long et al. (2011), Cagnina and Poian (2009)
	Immersion	Cagnina and Poian (2009)

APPENDIX 2 – Value propositions and offerings of online communities

Main class	Sub types of value proposi-tions	Sources	Offerings	Sources
Trust & credibility	**Trust**	Cho (2011), Väänänen-Vainio-Mattila and Wäljas (2009), Väänänen-Vainio-Mattila et al (2010), Chennamaneni (2006), Zhou (2011), Tsai and Cheng (2012), Preece and Shneiderman (2009), Camponovo (2011), Shalini et al. (2012), Bo et al. (2012), Honglei (2006), Zhou (2008), Unverdi-Creig and Jackson (2012), Ltifi (2011), Parasuraman et al. (1985), Preece (2004), Xiaoqing (2007), Sharratt and Usoro (2003), Gutierrez et al. (2012), Preece and Maloney-Krichmar (2003), Hernandes and Fresneda (2003), Myers and Newman (2007)	**Purpose statement**	Malinen and Ojala (2012), Väänänen-Vainio-Mattila et al (2010), Zhou (2011), Preece and Shneiderman (2009), Preece (2004), Xiaoqing (2007), Scott and Johnson (2005), Preece (2001), Preece and Maloney-Krichmar (2003), Lampe et al. (2010), Myers and Newman (2007)
	Policy / policies	Malinen and Ojala (2012), Väänänen-Vainio-Mattila et al (2010), Preece and Shneiderman (2009), Preece (2004), Xiaoqing (2007), Scott and Johnson (2005), Lin et al. (2007), Preece (2001), Preece and Maloney-Krichmar (2003), Ren et al. (2010)	**Offline events and activities**	Zhou (2011), Long et al. (2011), Zhou (2008), Robert and Duncan (2012), Scott and Johnson (2005), Hernandes and Fresneda (2003), Iriberri and Leroy (2009)
	Governance	Preece and Shneiderman (2009), Honglei (2006), Lin et al. (2007), Gutierrez et al. (2012)	**Support and moderation**	Lin et al. (2007), Gutierrez et al. (2012), Hernandes and Fresneda (2003)
	Commitment	Ojala and Saarela (2010), Tsai and Cheng (2012), Tsai and Pai (2010), Honglei (2006), Lin (2010), Unverdi-Creig and Jackson (2012), Sharratt and Usoro (2003), Gutierrez et al. (2012), Lampe et al. (2010), Ren et al. (2010), Tsai (2012)	**A few clear regulations**	Zhou (2008)
	Involvement	Tsai and Pai (2010), Camponovo (2011), Shipps and Phillips (2013), Shalini et al. (2012), Unverdi-Creig and Jackson (2012), Scott and Johnson (2005), Spagnoletti and Resca (2012), Gutierrez et al. (2012)	**Rules and guidelines**	Malinen and Ojala (2012),Cho (2011)
	Benevolence	Cheng and Liu (2012), Preece and Shneiderman (2009), Bo et al. (2012), Sharratt and Usoro (2003)	**Trust en-hancement tools**	Väänänen-Vainio-Mattila and Wäljas (2009), Väänänen-Vainio-Mattila et al (2010), Zhou (2011),
	Receptivity & receptiveness	Cheng and Liu (2012), Tsai and Pai (2010)	**Rituals**	Scott and Johnson (2005), Gutierrez et al. (2012)
	Empathy	Preece and Shneiderman (2009), Dong (2009), Preece (2004), Myers and Newman (2007)	**Etiquette**	Preece (2004), Scott and Johnson (2005)
	Integrity based trust	Sharratt and Usoro (2003)	**Planting conversa-tions**	Tsai and Pai (2010)
	Membership	Zhou (2011), Honglei (2006), Iriberri and Leroy (2009), Ren et al. (2010), Tsai (2012), Cagnina and Poian (2009)	**Welcoming messages**	Honglei (2006)
	Competence	Camponovo (2011), Bo et al. (2012), Zhou (2008), Unverdi-Creig and Jackson (2012), Parasuraman et al. (1985), Sharratt and Usoro (2003)	**Examples**	Tsai and Pai (2010)
	Welcoming at-mosphere	Preece and Shneiderman (2009), Honglei (2006), Gutierrez et al. (2012)	**Granting sufficient resources**	Chennamaneni (2006)
	Honesty	Parasuraman et al. (1985), Sharratt and Usoro (2003)	**Participation of experts**	Hernandes and Fresneda (2003)
	Transparency	Iriberri and Leroy (2009)	**Habit crea-tion**	Honglei (2006), Chou (2010), Redstrom (2006)
	Justice	Tsai and Cheng (2012)	**Role models**	Tsai and Pai (2010)
	Pro-sharing	Lin et al. (2007)	**Behavioral**	Wang et al. (2009),

	norms		**modeling**	
	Control	Cagnina and Poian (2009)	**Verbal persuasion**	Wang et al. (2009),
	Evolution of standards	Scott and Johnson (2005)		
	Alleviating fear (e.g. losing power and face)	Chennamaneni (2006), Tsai and Pai (2010), Sharratt and Usoro (2003)		
	Mentoring	Tsai and Pai (2010)		
	Sociality	Long et al. (2011), Lin (2010), Spagnoletti and Resca (2012), Gutierrez et al. (2012), Cagnina and Poian (2009)	**Communication and dialog tools**	Malinen and Ojala (2012), Ojala and Saarela (2010) Väänänen-Vainio-Mattila and Wäljas (2009), Tsai and Pai (2010), Bo et al. (2012), Honglei (2006), Lin et al. (2007), Preece (2001), Preece and Maloney-Krichmar (2003)
	Spirit and sense of community	Malinen and Ojala (2012), Lin (2010), Lin et al. (2007), Tsai (2012)	**Browsable user profiles**	Malinen and Ojala (2012), Väänänen-Vainio-Mattila and Wäljas (2009), Cheng and Liu (2012), Dongwon et al. (2010), Preece (2004), Scott and Johnson (2005), Gutierrez et al. (2012), Ren et al. (2010)
	Reciprocity	Väänänen-Vainio-Mattila et al (2010), Tsai and Pai (2010), Camponovo (2011), Shalini et al. (2012), Preece (2004), Sharratt and Usoro (2003), Preece (2001), Preece and Maloney-Krichmar (2003), Hernandes and Fresneda (2003)	**Feedback functions**	Malinen and Ojala (2012), Chen et al. (2012), Cheng and Liu (2012), Tsai and Pai (2010), Dong (2009), Gutierrez et al. (2012), Iriberri and Leroy (2009)
	Dialog	Tsai and Pai (2010), Unverdi-Creig and Jackson (2012), Preece (2004), Sharratt and Usoro (2003), Preece (2001), Preece and Maloney-Krichmar (2003)	**Social presence and awareness functions**	Malinen and Ojala (2012), Väänänen-Vainio-Mattila and Wäljas (2009), Dongwon et al. (2010), Dong (2009), Ren et al. (2010)
	Feedback from others	Malinen and Ojala (2012), Chen et al. (2012), Cheng and Liu (2012), Tsai and Pai (2010), Dong (2009), Gutierrez et al. (2012), Iriberri and Leroy (2009)	**Sharing tools**	Malinen and Ojala (2012), Väänänen-Vainio-Mattila and Wäljas (2009), Dongwon et al. (2010), Preece and Shneiderman (2009)
	Contacts	Preece and Shneiderman (2009)	**Private messages**	Malinen and Ojala (2012), Honglei (2006), Ren et al. (2010)
Sociality			**Achievements**	Ojala and Saarela (2010), Chen et al. (2012), Väänänen-Vainio-Mattila and Wäljas (2009)
			Chat	Dongwon et al. (2010), Ren et al. (2010), Cagnina and Poian (2009)
			Group formation tools	Malinen and Ojala (2012), Ojala and Saarela (2010) Dongwon et al. (2010)
			Networking tools	Malinen and Ojala (2012), Chen et al. (2009)
			Avatars	Dongwon et al. (2010), Ren et al. (2010)
			Discussions via forum	Malinen and Ojala (2012),Iriberri and Leroy (2009)
			Commenting	Malinen and Ojala (2012), Iriberri and Leroy (2009)
			Peer support mechanism	Malinen and Ojala (2012), Ojala and Saarela (2010), Dongwon et al. (2010)
			Status information	Malinen and Ojala (2012), Dongwon et al. (2010)
			Instant messages	Malinen and Ojala (2012), Ren et al. (2010)
			Tools to show empathy	Dong (2009), Myers and Newman (2007)
			Personal styles	Malinen and Ojala (2012), Cheng and Liu (2012)
			Tool to find friends	Preece and Shneiderman (2009)
			Collaboration tools	Preece and Shneiderman (2009)
			Non-verbal signs	Hernandes and Fresneda (2003)
			Member directory	Iriberri and Leroy (2009)
			List of masters	Chen et al. (2012)
Usability & system quality	**Usefulness**	Zhou (2011), Camponovo (2011), Chung et al. (2010), Shipps and Phillips (2013), Dong (2009), Bo et al. (2012), Honglei (2006), Unverdi-Creig and Jackson (2012), Sharratt and Usoro (2003), Lin et al. (2007)	**Privacy protection**	Malinen and Ojala (2012), Ojala and Saarela (2010) Väänänen-Vainio-Mattila and Wäljas (2009), Väänänen-Vainio-Mattila et al (2010), Preece and Shneiderman (2009), Chung et al. (2010), Spagnoletti and Resca (2012), Iriberri

				and Leroy (2009)
	Useful or convenience system	Zhou (2011), Udo et al. (2010), Tsai and Pai (2010), Unverdi-Creig and Jackson (2012), Preece (2001)	**Privacy settings and levels**	Malinen and Ojala (2012), Ojala and Saarela (2010) Väänänen-Vainio-Mattila and Wäljas (2009), Väänänen-Vainio-Mattila et al (2010), Chung et al. (2010), Spagnoletti and Resca (2012)
	Satisfying service UI design and usability	Malinen and Ojala (2012), Chen, Chang and Liu (2012), Väänänen-Vainio-Mattila and Wäljas (2009), Udo et al. (2010), Tsai and Pai (2010), Preece and Shneiderman (2009), Robert and Duncan (2012), Lin et al. (2007), Gutierrez et al. (2012), Preece (2001), Preece and Maloney-Krichmar (2003), Iriberri and Leroy (2009)	**Searching and filtering tools**	Malinen and Ojala (2012), Väänänen-Vainio-Mattila and Wäljas (2009), Cheng and Liu (2012), Tsai and Pai (2010), Preece and Shneiderman (2009), Gutierrez et al. (2012), Preece and Maloney-Krichmar (2003)
	Privacy	Malinen and Ojala (2012), Ojala and Saarela (2010) Väänänen-Vainio-Mattila and Wäljas (2009), Väänänen-Vainio-Mattila et al (2010), Preece and Shneiderman (2009), Chung et al. (2010), Spagnoletti and Resca (2012), Iriberri and Leroy (2009)	**Adjustable personal info**	Malinen and Ojala (2012), Väänänen-Vainio-Mattila and Wäljas (2009), Iriberri and Leroy (2009)
	General ease of use	Väänänen-Vainio-Mattila and Wäljas (2009), Dongwon et al. (2010), Camponovo (2011), Chung et al. (2010), Lin et al. (2007), Preece (2001)	**Data storage**	Ojala and Saarela (2010), Long et al. (2011), Iriberri and Leroy (2009)
	Easy-to-use navigation	Chou (2010), Udo et al. (2010), Preece and Shneiderman (2009), Zhang et al. (2009), Lin et al. (2007), Gutierrez et al. (2012), Preece (2001), Preece and Maloney-Krichmar (2003)	**Easy information retrieval or recovery**	Long et al. (2011), Iriberri and Leroy (2009)
	Ease of search	Lin et al. (2007)	**Fast loading and response times**	Väänänen-Vainio-Mattila and Wäljas (2009), Lin et al. (2007)
	Reliability	Bo et al. (2012), Parasuraman et al. (1985), Sharratt and Usoro (2003), Hernandes and Fresneda (2003)	**Faq**	Udo et al. (2010), Preece and Shneiderman (2009)
	Interactivity	Dongwon et al. (2010), Shipps and Phillips (2013), Preece (2001)	**Animated demos and videos**	Preece and Shneiderman (2009), Robert and Duncan (2012)
	Synchronicity	Dong (2009), Gutierrez et al. (2012)	**Diary**	Ojala and Saarela (2010)
	Security	Parasuraman et al. (1985), Spagnoletti and Resca (2012), Preece (2001)	**Statistics**	Ojala and Saarela (2010)
	Playfulness	Montola et al. (2009), Shalini et al. (2012)	**Easy info adding tools**	Ojala and Saarela (2010)
	Simple task design	Robert and Duncan (2012)	**Tutorials**	Preece and Shneiderman (2009)
	Cognitive absorption	Shalini et al. (2012)	**Segment users by their experience**	Robert and Duncan (2012)
	Realism	Cagnina and Poian (2009)	**No risk-trials**	Robert and Duncan (2012)
	Quality of system	Chung et al. (2010)	**Contextual information**	Väänänen-Vainio-Mattila and Wäljas (2009)
	Personal uses	Ojala and Saarela (2010)	**Understandable terminology**	Väänänen-Vainio-Mattila and Wäljas (2009)
	Visual clarity	Väänänen-Vainio-Mattila and Wäljas (2009)	**Multilingual**	Preece and Shneiderman (2009)
	Flexibility of task flow	Väänänen-Vainio-Mattila and Wäljas (2009)	**Cross-platform integration**	Väänänen-Vainio-Mattila and Wäljas (2009)
Content & information	**Quality of content**	Väänänen-Vainio-Mattila and Wäljas (2009), Väänänen-Vainio-Mattila et al (2010), Cheng and Liu (2012), Zhou (2011), Tsai and Pai (2010), Zhang et al. (2009), Sangwan (2005), Lin et al. (2007)	**Content and information**	Malinen and Ojala (2012), Väänänen-Vainio-Mattila and Wäljas (2009), Väänänen-Vainio-Mattila et al (2010), Cheng and Liu (2012), Udo et al. (2010), Tsai and Pai (2010), Wang et al. (2009),
	Content accessibility	Udo et al. (2010), Tsai and Pai (2010), Spagnoletti and Resca (2012), Preece and Maloney-Krichmar (2003)	**Updated content**	Väänänen-Vainio-Mattila et al (2010), Cheng and Liu (2012), Preece and Shneiderman (2009), Long et al. (2011), Preece (2001)
	Informativeness of content	Cheng and Liu (2012), Tsai and Pai (2010), Wang et al. (2009), Long et al. (2011)	**Content creation tools**	Cagnina and Poian (2009)
	Quantity of content	Tsai and Pai (2010), Preece and Shneiderman (2009), Honglei (2006), Gutierrez et al. (2012)	**Show popular content**	Malinen and Ojala (2012), Dongwon et al. (2010)
	Interesting content	Ojala and Saarela (2010), Väänänen-Vainio-Mattila and Wäljas (2009), Long et al. (2011), Iriberri and Leroy (2009)	**Most viewed content**	Malinen and Ojala (2012), Dongwon et al. (2010)
	Relevancy and usefulness of content	Malinen and Ojala (2012), Cheng and Liu (2012), Preece and Shneiderman (2009), Gutierrez et al. (2012)		
	Quality of presentation	Tsai and Pai (2010), Zhang et al. (2009)		
	Content functionality	Väänänen-Vainio-Mattila and Wäljas (2009), Väänänen-Vainio-Mattila et al (2010)		
	Structure of content	Zhang et al. (2009)		
	Informative con-	Cheng and Liu (2012), Tsai and Pai (2010), Wang et al. (2009), Long et al. (2011)		

	tent			
Rewards and incentives	**Public recognition**	Malinen and Ojala (2012), Ojala and Saarela (2010) Chen et al. (2012), Väänänen-Vainio-Mattila et al (2010), Tsai and Pai (2010), Preece and Shneiderman (2009), Camponovo (2011), Bo et al. (2012), Scott and Johnson (2005), Lin et al. (2007), Gutierrez et al. (2012), Iriberri and Leroy (2009)	**Status and activity levels**	Malinen and Ojala (2012), Chen et al. (2012), Cheng and Liu (2012), Long et al. (2011), Preece and Shneiderman (2009), Long et al. (2011), Honglei (2006), Gutierrez et al. (2012)
	Strengthen feeling of competence (self-efficacy)	Chou (2010), Tsai and Cheng (2012), Lu and Hsiao (2007), Wang et al. (2009), Dong (2009), Chen et al. (2009), Zhou (2008), Robert and Duncan (2012), Unverdi-Creig, and Jackson (2012), Zhang et al. (2009)	**Incentive to enhance status**	Honglei (2006)
	General incentives	Chennamaneni (2006), Tsai and Pai (2010), Honglei (2006), Xiaoqing (2007), Scott and Johnson (2005), Sharratt and Usoro (2003), Lin et al. (2007), Iriberri and Leroy (2009)	**Status symbols**	Montola et al. (2009), Preece and Shneiderman (2009), Iriberri and Leroy (2009)
	Acknowledgement	Camponovo (2011), Shalini et al. (2012), Honglei (2006), Scott and Johnson (2005), Preece and Maloney-Krichmar (2003)	**Visibility of contribution**	Preece and Shneiderman (2009)
	Reputation	Chennamaneni (2006), Long et al. (2011), Bo et al. (2012), Preece and Maloney-Krichmar (2003)	**User roles**	Malinen and Ojala (2012), Väänänen-Vainio-Mattila et al (2010), Scott and Johnson (2005), Spagnoletti and Resca (2012), Gutierrez et al. (2012), Preece (2001), Iriberri and Leroy (2009), Hartwick and Barki (1994)
	Social reward	Malinen and Ojala (2012), Ojala and Saarela (2010) Chen et al. (2012), Chennamaneni (2006), Camponovo (2011)	**Acknowledge helpful contributions**	Camponovo (2011), Shalini et al. (2012), Honglei (2006), Scott and Johnson (2005), Preece and Maloney-Krichmar (2003)
	Activity reward	Malinen and Ojala (2012), Chen et al. (2012), Chen et al. (2012), Honglei (2006)	**Rewards for accomplishments and recognize contributions**	Malinen and Ojala (2012), Chen et al. (2012), Honglei (2006), Preece (2004)
	Rewards for quantity of contributions	Preece and Shneiderman (2009), Honglei (2006), Gutierrez et al. (2012)	**Achievements**	Ojala and Saarela (2010), Montola et al. (2009), Väänänen-Vainio-Mattila and Wäljas (2009), Robert and Duncan (2012), Cagnina and Poian (2009)
	Encouragement	Robert and Duncan (2012), Cho (2011)	**Rating schemes**	Malinen and Ojala (2012), Tsai and Pai (2010), Preece and Shneiderman (2009), Long et al. (2011)
	Economic incentive	Chennamaneni (2006), Camponovo (2011)	**Gifts**	Chen et al. (2012), Tsai and Pai (2010)
	Enforcement	Scott and Johnson (2005)	**Power levels**	Honglei (2006), Scott and Johnson (2005)
	Supportive climate	Chennamaneni (2006)	**Point collection mechanism**	Tsai and Pai (2010), Cho (2011),
	Material reward	Chen et al. (2012)	**Visibility**	Preece and Shneiderman (2009), Iriberri and Leroy (2009)
			Privileges	Scott and Johnson (2005), Iriberri and Leroy (2009)
			Career advancement	Chennamaneni (2006), Sharratt and Usoro (2003)
			Monetary or economic reward	Chennamaneni (2006)
			Credits and virtual credits	Chen et al. (2012)
			Ceremonies	Tsai and Pai (2010)
			Voting	Malinen and Ojala (2012), Dongwon et al. (2010)
			Ranking system	Gutierrez et al. (2012)
			Leader boards	Tsai and Pai (2010)
			Honor, loyalty program	Malinen and Ojala (2012), Dongwon et al. (2010)
			Rewards for quality of contribution	Gutierrez et al. (2012)
			Reward for uniqueness of contents	Iriberri and Leroy (2009)

APPENDIX 3 – Stimuli themes based on CIS framework's elements in full

ID	CIS element	Stimuli description
1	**Social nature of use**	This means that using this database you can build social connections and network to other hobbyists. You can also get information and learn new skills from other users. This may also mean that wide audience has access to this database. This may also mean getting new contacts and building new friendships and getting acquainted with groups of people, which share similar interest with you. This may also mean arranging meetings and events with other people. This also can mean taking part in conversations with other users in topics of interest to you.
2	**Context of use**	This means that this database functions well in different situations and contexts. It works independent of the location of time and spread over different physical locations. This means it works in different devices, such as in mobile phones and tablets. It can be utilized while detecting outdoors, or when you're at computer at home, as well as in other situations. This means that database can be used in different languages for the people from different backgrounds and that it offers different ways to use it.
3	**Construction of identities**	This means that you can build yourself and your identity either as a professional person or as a hobbyist using this database. For example you can be active part of this community and thus maybe get appreciation and attention. With this service you can also build a virtual identity which you want. Building identity can also mean that using the service is adapted by your own identity as professional or hobbyist person.
4	**Service process experience**	The service process experience means the flow state occurring during usage situation, which means you get absorbed to the use of the service. This can also mean that using the service is perceived almost like playing social game or some other nice activity which is done for fun. It mean that you can find your own personal way of experiencing it. This can refer also to a single feature, such as functionable searching functions. The service process experience means the pleasure perceived of using the service.
5	**Customer goals and outcomes**	This means that the database account not just yours but other different people's goals and motives. These goals can be e.g. doing things just in the sake of themselves, or then using it as instrument to reach some external goal. Other goals can be e.g. going outdoors, interest in the past and legality. You can use the database to feed your curiosity, for learning or to support your other activities. This also means that the database offers suitable means to use the service for each users.
6	**Participation in service production**	This means that you can participate in the operation of this service in a role suitable to you; either as hobbyist, or as professional. For example you can feel doing meaningful and good thing which increase common good and feel that your help is needed. Participation can also mean crowdsourcing, which means that you can participate by doing a tiny little part of the huge whole, and therefore contribute in reaching common goals.