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Perceived Sociability of Use and Individual Use of Social Networking Sites – A Field Study of Facebook Use in the Arctic

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ABSTRACT

This paper investigates determinants of individual use of social network sites (SNSs). It introduces a new construct, Perceived Sociability of Use (PSOU), to explain the use of such computer mediated communication applications. Based on a field study of 113 Facebook users it shows that PSOU in the sense of maintaining social contacts is a significant predictor of Perceived Benefits (PB), Perceived Enjoyment (PE), attitude toward use and intention to use. Inspired by Benbasat and Barki, this paper also attempts to answer questions "what makes the system useful", "what makes the system enjoyable to use" and "what makes the system sociable to use". As a consequence it pays special focus on systems characteristics of IT applications as potential predictors of PSOU, PB and PE, introducing seven such designable qualities (user-to-user interactivity, user identifiability, system quality, information quality, usability, user-to-system interactivity, and aesthetics). The results indicate that especially satisfaction with user-to-user interactivity is a significant determinant of PSOU, and that satisfactions with six of these seven designable qualities have significant paths in the proposed nomological network.

TYPE OF PAPER AND KEYWORDS

Regular research paper: *social networking, individual use, acceptance, sociability of use*

1 INTRODUCTION

Social networking site (SNS) applications such as Facebook, LinkedIn, Twitter, and so on have become popular during the last few years. Facebook alone claims that it has more than 874 million monthly active users and 727 million daily active users on average in September 2013[1].

There is an increasing body of quantitative nomothetic research into SNS use (e.g. [3, 15, 16, 17, 22, 43, 50, 54, 64, 65, 72, 76, 80, 91, 94, 97]). A serious limitation of the above studies is that they tend omit in their research models the simple fact that SNSs are used for socializing. Only [17] among the above sixteen studies include maintaining interpersonal contacts as one reason of using a SNS application (Facebook in its case), discovering it to be a significant predictor of "we-intention" to use.[2] Błachnio et al. [9] in their re-

[1] http://newsroom.fb.com/content/default.aspx?NewsAreaId=22, accessed November 21, 2013

[2] [17] adopts a definition of we-intention as a "commitment of an individual to engage in joint action and involves an implicit or explicit agreement between the participants to engage in that joint action" (p. 1338).

view of 59 articles on the antecedents of Facebook use identify only one study that suggests socializing to be a determinant of SNS (Facebook) use, but it is not an independent empirical work.

However, when looking at the SNS literature more widely the motivation to keep in touch with friends has been recognized [113]. Brandzæg and Heim [12], for example, found in their descriptive study that the most important reason for the use of SNS applications is to get in contact with new people (31%) and the second most important reason is to keep in touch with friends (21%), the third one being general socializing (14%), but for some reason it has not influenced quantitative nomothetic research on SNS use.

To address the above omission this paper proposes a new construct Perceived Sociability of Use (PSOU) to explain the individual use of SNS applications. PSOU describes the extent to which a user believes that using an IT application will help him/her create and maintain social contacts. The major purpose here is to test the significance of PSOU as a predictor of individual intention to use an SNS application.

Many of the above articles on SNS use apply the Technology Acceptance Model (TAM) [26] or comparable theoretical models to explain individual use of SNS applications [16, 43, 50, 54, 64, 65, 72, 80, 97]. There are signs that this line of research will suffer from the same problems as prior TAM research [6], each researcher extending TAM in his/her own direction by including one or two new "external variables" [25] in the model. This inevitably leads to patchy research into SNS applications without any cumulative tradition.

Benbasat and Barki [6] also point out that TAM and related research has been weakly linked with design. Instead, it has focused on various contextual and personal characteristics of users as determinants of use [60]. Many of the studies on the individual use of SNSs have also had a similar interest (see [9] for a review) – for example, in the role of the "big five" personality characteristics as determinants of SNS use [22, 54, 76, 91, 94].

The major reason for the weak link with design is that very little effort in TAM research has investigated "what actually makes the system useful" [6]. To answer this question one must open up technology as a black box and focus on system characteristics, which may make the system useful.[3]

Following again the TAM tradition, much of research into SNS use has also treated technology as a black box without any systematic attention to designable characteristics of the sites studied. It has just focused on sites such as CyWorld [50, 97], Facebook [17, 65, 72, 76, 91, 94], Yahoo!Groups [64], or multiple ones [3, 16, 22, 43, 54, 80] without attention to what in these sites makes them useful.

So, the purpose of this paper is not only to investigate how PSOU may affect individual use of SNS applications, but also to study what designable characteristics of SNSs make them useful, enjoyable and above all sociable to use. As a consequence, the model includes seven designable qualities – user-to-user interactivity, user identifiability, system quality, information quality, usability, user-to-system interactivity, and aesthetics – as potential predictors of PSOU and SNS use more generally. Recognizing the nature of SNSs as Computer Mediated Communication (CMC) applications, the paper pays special attention to user-to-user interactivity and user identifiability among those seven predictors. Overall, the idea is to explain the individual use of SNS applications in terms of actionable technology/design-oriented system qualities rather than in terms of psychological characteristics of users and other contextual variables that are largely beyond developers' control. The latter are left for future research.

2 THEORETCAL BACKGROUND

Individual use of IT applications has been the most intensively researched topic in Information Systems (IS) since the publication of the TAM more than twenty years ago [26, 53, 60, 61, 96, 107, 116]. It has also inspired research into individual use of SNS applications.

Prior research has suggested that individuals use technology because its usage is useful and beneficial (extrinsically motivating) and because it is enjoyable (intrinsically motivating) [27]. Inspired by research into online communities [68, 82], the present paper suggests social relatedness as a third motive of using IT artifacts – IT applications may be used to create and maintain social contacts. As noted in Introduction, research into SNS applications has failed to recognize PSOU or equivalent constructs as a reason of using SNS applications and potentially as a major predictor of their use.

2.1 Related Research

Human beings have a basic need to be in contact with other humans [2, 29, 71]. Baumeister and Leary [5], for example, argue for the "belongingness hypothesis", which states "human beings have a pervasive drive to form and maintain at least a minimum quantity of lasting, positive, and significant interpersonal relationships" (p. 497). They also conclude that existing evi-

[3] In fact, if we take the question seriously, it should be a norm in quantitative nomothetic IS research into the use of IT applications to include such designable characteristics and their exclusion should be justified rather than vice versa.

dence supports the hypothesis that the need to belong is a powerful, fundamental, and extremely pervasive motivation.

In view of the fact that CMC applications such as e-mail have been around more than 30 years and that there is considerable research into the e-mail use, it is amazing that there is so little research into the influence of PSOU (or of an equivalent construct) on the individual use of IT applications. Yousafzai et al. [116] identify close to 20 TAM studies that have addressed CMC applications, none of them including a construct similar to PSOU. Yet, IT applications such as e-mail may be used to create and maintain social contacts and relationships [41]. The phrase "perceived sociability of use" to be introduced below attempts to capture the degree to what extent a user believes that using an IT application help him/her satisfy the relatedness need.

To the author's knowledge, Preece [82] was the first to introduce sociability as a central determinant of the success of online communities. She characterizes it as the nature of social (human-to-human) communication supported by technology. Although inspiring the present work, her conceptualization of sociability does not correspond to PSOU as the extent to which a user believes that using an IT application will help him/her create and maintain social contacts.

Later several authors have proposed constructs related to the relatedness motivation to explain individual use of IT applications [49, 61, 63, 79, 90, 93, 100], but [63] as an exception, they do not introduce constructs similar to PSOU.

Li et al. [61] study the influence of attachment motivation, relationship commitment and perceived critical mass on perceived usefulness and perceived enjoyment and further on behavioral intention to use instant messaging. Attachment motivation and relationship commitment are conceptually close to the relatedness motivation discussed above, but [61] includes them purely as psychological characteristics of users without any reference to technology, i.e. the behavioral belief to what extent the users perceive instant messaging to help to satisfy their attachment needs. Quite interestingly, [61] found both attachment motivation and relationship commitment to have significant influence on perceived enjoyment, but not on perceived usefulness.

Ryan et al. [93] found relatedness to be a significant predictor of intended future playing, game enjoyment, hours per week of play, and post play mood in the case multi-user online computer games. Roca and Gagné [90] observed perceived relatedness to be a significant predictor of perceived usefulness, but not of perceived playfulness in the nomological net explaining e-learning continuance intention, while Sørebo et al. [100] found the two paths to be insignificant. When comparing these seemingly inconsistent results one should note that [90] and [100] measured perceived relatedness as a general relatedness need (e.g. "I get along with people at work") without any reference to behavioral beliefs related to technology, while [93] measured how connected participants felt to other players in the game (e.g. "I find the relationships I form in the game fulfilling"). The measure of [93] is closer to PSOU, but does not capture its idea as a belief as defined in the present paper.

Building on [82], Phang et al. [79] study the effect of perceived usability and perceived sociability on the knowledge seeking and knowledge contributing activities through online community systems. According to their interpretation "sociability refers to characteristics of an online community system that support 'a state of being sociable' (…) where members find it pleasant to interact with each other in attaining community-shared purposes through the technology-enabled space" (p. 728). PSOU differs from this conception - it does not refer to system characteristics but it is a behavioral belief describing the extent to which a user believes that using an IT application will help him/her create and maintain social contacts.

Lin and Bhattacherjee [63] propose a model for usage of multi-user video games. The model also includes "interaction quality" that is assumed to explain social image and "technical quality" that is hypothesized to explain perceived enjoyment. Furthermore, perceived enjoyment and social image are hypothesized to explain attitude toward usage and attitude to explain usage intention. Social image reflects extrinsic motivation – it refers to "as the extent to which users may derive respect and admiration from peers in their social network as a result of their IT usage" (p. 167). The authors define interaction quality in terms quite similar to PSOU: "Interaction quality refers to the extent to which a system allows individual users to cultivate, foster and maintain online relationships with others in their social network" (p. 168). One should note, however, that they assume "interaction quality" (≈ PSOU) to explain social image only, and do not test if it may directly explain perceived enjoyment, attitude toward to use and usage intention.

Junglas et al. [49] study the influence of system quality, information quality and sociability on perceived usefulness, perceived ease of use and perceived enjoyment in the case of Second Life. They characterize sociability as follows: "If sociability is defined as the urge of an individual to seek out others to have a pleasurable or playful experience, then sociability in a technology-mediated space should be defined as those parts of an individual's sociability desire that can be met through the use of technology. In other words, it represents the degree to which an individual's desire to socialize is satisfied through a system that is able to provide social interactions with others" (p. 587). So, it is technology-oriented part of the relatedness need, and

not a behavioral belief in the sense of PSOU. Furthermore, [49] assumes sociability to explain only enjoyment, while PSOU has a much more pivotal role in the research model to be tested below.

In conclusion, most of the constructs related to sociability introduced in the above studies are defined in terms totally independent of technology [61, 90, 100] or, if technology is included [49, 63, 79, 93], [63] as an exception, they do not capture the idea of PSOU.

2.2 Perceived Sociability of Use of IT Applications

Inspired by TAM [25, 26, 27], UTAUT [109] and by Self-Determination Theory (SDT) [29, 92], Figure 1 suggests a model of individual use of IT applications that distinguishes three behavioral beliefs – perceived benefits (PB), perceived enjoyment (PE) and perceived sociability of use (PSOU), which correspond to the three underlying human motives: extrinsic motivation, intrinsic motivation and social relatedness motivation.[4] *PB describes the degree to what extent a user believes that using the system helps him/her attain some beneficial consequences separable from the activity of using the system*. Conceptually, PB resembles perceived usefulness [25] and perceived performance expectancy [109], but attempts to be broader. These consequences include all kind of benefit evaluations the user considers significant, not only usefulness in work as in TAM and UTAUT. *PE describes the extent to which a user believes that using the system is enjoyable as itself* [27]. *PSOU describes the extent to which a user believes that using an IT application will help him/her create and maintain social contacts* and to satisfy the relatedness need in that way.[5]

Adapting UTAUT [109], Figure 1 also includes perceived cost and effort (PCE) as a fourth behavioral belief. *PCE describes a users' belief of how much effort the use of the system takes and/how much it costs*. It is close to effort expectancy in [109], but emphasizes more costs, assuming that the individual use of some IT applications (such as Internet phone calls) may to a considerable extent be influenced by cost considerations (not only by the effort required).

One should note that the focus of Figure 1 lies in the behavioral beliefs (PB, PE, PSOU, PCE), which are assumed to explain attitude toward use and intention to use. Extrinsic motivation, intrinsic motivation and social relatedness motivation as experienced by users are psychological characteristics, which as such lie outside the scope of this paper. Nevertheless, they are introduced as theoretical justifications of the position of PSOU in the nomological network of Figure 1.

The paths PB → Attitude toward use, PB → Behavioral intention to use, PE → Attitude toward use, PE → Behavioral intention to use, PCE → PB, PCE → Attitude toward use, and PCE → Behavioral intention to use in Figure 1 are argued in several studies (e.g. [26, 27, 107, 109]) and that theoretical reasoning will not be repeated here. Instead the focus will be on the role of PSOU, mainly building on SDT [29, 92].

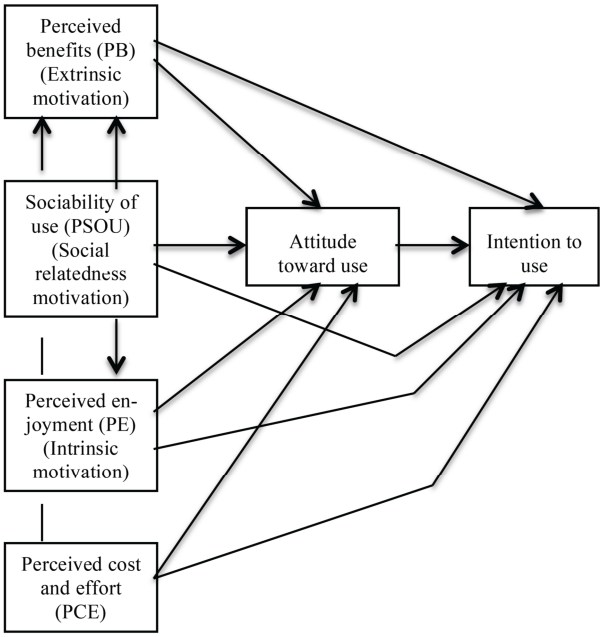

Figure 1: Motives of individual use of IT applications

SDT identifies relatedness as one of three basic needs – need for autonomy, need for competence and need for relatedness. Each of them is assumed to affect extrinsic and intrinsic motivation [30]. Autonomy involves acting with a sense of volition and having the experience of choice, perceived competence means that people feel efficacious with respect to the activities in question, and relatedness refers to the need to feel belongingness and connectedness with others [30].

Deci and Ryan [31] note, however, that it "is worth noting that these three needs – for competence, relatedness, and autonomy – were not simply assumed or formulated based on causal theorizing but were derived empirically" (p. 87), implying that the relationship between the three needs and the two forms of motivation is not necessarily straightforward.

[4] Veroff [110] makes a distinction between relatedness and belongingness, associating the former with childhood and the latter with adolescence. In line with psychological theories such as Existence, Relatedness and Growth theory [2] and SDT [29], this paper uses the term "relatedness".

[5] Appendix C introducing the questionnaire provides a more concrete idea of the constructs of Figure 1.

This paper focuses only on relatedness among these three needs.[6] The phrase "Perceived Sociability of Use" attempts to capture the degree to what extent a user perceives or expects using an IT application to help him/her satisfy the relatedness need. In the following we will argue for the four hypotheses: PSOU → PB, PSOU → PE, PSOU → Attitude toward use and PSOU → Behavioral intention to use.

2.2.1 Hypothesis PSOU → PB

SDT bases the relationship between relatedness need and extrinsic motivation on the concepts of internalization and integration. "Internalization refers to people's 'taking in' a value or regulation, and integration refers to the further transformation of that regulation into their own so that, subsequently, it will emanate from their sense of self" ([92], p. 71). Through internalization and integration externally regulated behavior performed to satisfy an externally imposed demand or reward may at least in principle become integrated regulation, in which identified regulations are fully assimilated to the self. Reflecting this transition, SDT distinguishes four forms of extrinsic motivation: external regulation, introjected regulation, identified regulation, and integrated regulation, each form representing increasing self-determination. Externally regulated behaviors are performed to satisfy an external demand, introjection involves taking in a regulation but not fully accepting it as one's own, in identification the regulation and action are accepted or owned as personally important, and in integration the regulation is fully assimilated so that actions characterized by integrated motivation share many features of intrinsic motivation [92].[7] SDT assumes that the relatedness need is positively associated with internalization in particular. The process of internalization and integration reinforces extrinsic motivation when making it more internalized and more self-determined.

This process of internalization and integration may also be relevant in the case of SNS use, if a person feels that it is externally regulated, when (s)he perceives strong social pressure or a social norm, for instance, to use a SNS (see [3] and [15] for studies on SNS use that includes subjective norm). Internalization may change this externally regulated behavior towards more self-determination (closer to intrinsic motivation).

One should note that PSOU conceptually is not a need, but a belief of to what extent a user believes that using system will help him/her satisfy the relatedness need. The logic of reasoning in the case of association PSOU → PB is (i) if the relatedness need is positively associated with extrinsic motivation (PB) as SDT posits, and (ii) when PSOU describes the extent to which a user believes that using an IT application helps him/her create and maintain social contacts (i.e. to satisfy the relatedness need), then there is a positive relationship between PSOU and PB.

The concepts of social image and social capital - as potential benefits of SNS use - provide additional explanations for the path between PSOU and PB. Social image [63] was discussed in Section 2.1. Referring to [21], Ellison et al. [34] characterizes social capital as "the resources accumulated through the relationships among people" (p. 1145). They report that there is a positive relationship between Facebook use and the maintenance and creation of social capital. Although they conclude that one cannot say which precedes the other, in the statistical analyses they consider social capital as a dependent variable affected by Facebook use rather than vice versa.

Chang and Zhu [16] include two forms of social capital – bridging social capital and bonding social capital [84] – as antecedents of SNS continuance intention. The former refers to weaker ties, loose connections between individuals, whereas the latter refers to stronger ties, tightly-knit and emotionally close relationships, such as those felt among family and close friends. [16] found that perceived bridging social capital predicts the intention, but perceived bondage capital does not.

PSOU as the extent to which a user believes that using an IT application helps him/her create and maintain social contacts can be expected to be positively associated with expectations of social image and social capital accruing from SNS use. Since they represent benefits of SNS use, it provides additional support for the hypothesis that PSOU is positively associated with PB.

2.2.2 Hypothesis PSOU → PE

SDT does not argue very succinctly the relationship between the relatedness need and the intrinsic motivation. In the case of the associations with intrinsic motivation, [92] states "some work suggests that satisfaction of the need for relatedness, at least in a distal sense, may also be important for intrinsic motivation." (p. 71). Going beyond SDT the argu-

[6] Autonomy and competence are contextual factors influencing and possibly also being influenced by individual use. Autonomy covers the effects of a number of constructs such as social influence and voluntariness [109] or intervenes them. Competence closely corresponds to self-efficacy that has received considerable attention in the IS literature [69].

[7] Figure 1 does not distinguish the four forms of extrinsic motivation, but views them together with intrinsic motivation as a continuum of self-determination [29, 92]. The relative emphasis put on extrinsic motivation and intrinsic motivation by a respondent describes his/her position on the continuum of self-determination. This interpretation is in line with [27].

mentation here is that much of the social interaction satisfying the relatedness need is also intrinsically rewarding. Assuming that the relatedness need drives a person into social interaction, one can conjecture that the higher the relatedness need is, the more social interaction one has, and more intrinsically rewarding that interaction is to him/her.

The concept of internalization and integration provide an additional support for the association between the relatedness need and PE. As explained in the context of PSOU → PB, the process of internalization and integration makes behavior more internalized and more self-determined, closer to intrinsic motivation. Even though representing extrinsic motivation, these more internalized and self-determined behaviors may be perceived more enjoyable than more externally imposed behaviors.

The logic of reasoning in the case of associations PSOU → PE is analogous to that applied in the context PSOU → PB: (i) if the relatedness need is positively associated with intrinsic motivation (PE) as argued above, and (ii) when PSOU describes the extent to which a user believes that using an IT application helps him/her create and maintain social contacts (i.e. to satisfy the relatedness need), then there is a positive relationship between PSOU and PE.

2.2.3 Hypothesis PSOU → Attitude toward use and Behavioral intention

PSOU may not be only of instrumental value that supports PB and PE, but it may directly motivate IT application use (PSOU → Attitude toward use, PSOU → Behavioral intention to use). The reason is that the psychological literature suggests that human beings have a basic need to be in contact with others and that the need to belong is a powerful, fundamental, and extremely pervasive motivation (see Section 2.1). So, if a user believes that using an IT application helps him/her to satisfy his/her relatedness need by creating and maintaining social contacts (PSOU), his/her attitude toward using that application gets more positive and his/her behavioral intention to use increases.

2.3 Designable Qualities of IT Applications

As discussed in Introduction, quantitative nomothetic research into SNSs has been weakly linked with design, the major reason being that it has treated SNSs largely as black boxes. This paper attempts to open the black boxes by including seven technology-oriented designable qualities to be introduced next. Inspired by [6] the purpose of all this is to provide a potential to answer questions such as "what makes the system useful", "what makes the system enjoyable to use" and "what makes the system sociable to use".

Table 1 introduces the seven designable qualities or system characteristics, which are fairly directly designable or actionable. As they are specific to IT, there is no reference theory that would justify their inclusion. The question is about first attempts to build an IT specific "theory for analyzing" [39], which would allow to answer the above questions.[8]

Reflecting the interest in SNSs, the special focus of this paper lies in user-to-user interactivity and user identifiability, both of which can be expected to be central in the case of CMC applications [95]. In the following we will introduce these concepts before proceeding to other designable qualities.

Table 1: Designable qualities included

Designable quality	Explanatory comments
User-to-user interactivity	User-to-user interactivity supported by qualities such as reciprocity, multimodality, and responsiveness [48, 73]
User identifiability	User identifiability covering user anonymity as a special case [57, 86, 103]
System quality	System quality in the sense of [32], excluding aspects of usability
Information quality	Information quality in the sense of [32]
Usability	Usability in the sense of ease of use and ease of learning [83]
User-to-system interactivity	User-to-system interactivity supported by qualities such as user control of the interaction, reciprocity, multimodality, and system responsiveness of the user-system the interaction [48, 73]
Aesthetic quality	Aesthetic quality referring to the beauty of IT artifacts, covering classical aesthetics and expressive aesthetics [56]

The concept of interactivity has been the topic of a long debate, leading to a number of conceptualizations (see [48, 85, 95, 117] for recent reviews). Following McMillan [73] Table 1 separates user-to-user interactivity and user-to-system interactivity.[9] Adapting [48]

[8] Appendix C introducing the questionnaire provides a more concrete idea of the constructs of Table 1.

[9] [73] also identifies user-to-documents interactivity (or user-to-content interactivity more generally), noting that it is often difficult to distinguish from the two other forms of interactivity. In the present paper it is included in user-to-system interactivity.

we identify three facets of user-to-user interactivity – reciprocity, multimodality and responsiveness. Reciprocity is "the extent to which communication is perceived to be reciprocal or to allow mutual action" and responsiveness is "the degree to which the responses in a communication are perceived to be appropriate and relevant" ([48], p. 41). Differing from [48] the present paper interprets responsiveness to include also the speed of response. So, whether the system allows synchronous or asynchronous user-to-user interaction is a question of responsiveness. Multimodality covers non-verbal communication in [48].[10]

User identifiability and especially anonymity (as non-identifiability) have been of interest especially in CMC research (e.g. [57, 86, 103]). Following early research into group decision support systems [33, 47], one line of research has been interested in the influence of anonymity on communication effectiveness [67, 86]. A second line of research has been interested in the effect of user anonymity and/or identifiability on social processes such as identification with the group [57] and sense of community [10]. As a consequence our special interest lies in the influence of user identifiability on the use of SNS applications.

In addition to the two focal designable qualities introduced above, Table 1 includes five additional ones as control variables: system quality [32], information quality [32], usability [83], user-to-system interactivity [48, 73], and aesthetic quality [56].[11]

In the case of user-to-system interactivity we identify four facets – control, reciprocity, multimodality, and responsiveness. Control corresponds to the 'center of control' (human vs. computer) in [73]. Reciprocity and responsiveness are adapted from [48] to the context user-to-system interactivity. However, system responsiveness is assumed to cover also speed of response, and multimodality covers rich interfaces exemplified by audio techniques (e.g. speech recognition and production), haptic devices and use of special headgears, gloves and suits used to interact with the system [104]. However, because user interaction with Facebook relies on traditional GUI technologies, multimodality as a facet of user-to-system interactivity will not be included in this study.

[10] The three qualities of user-to-user interactivity are also significant determinants of media richness [24]. Reciprocity and responsiveness allow instant feedback, multimodality includes multiple cues and language variety, and reciprocity support personal focus. Similarly, they also support the sense of social presence [8, 99] as the degree to which a person interprets other people to be physically present when interacting with them [40] or as a psychological state in which the virtuality experience is unnoticed [59].

[11] In the case of the usability, we focus on the "core" usability, i.e. on ease of use and ease of learning [83], rather than in usability is the broad meaning as used in [46].

2.4 The Model to Be Tested

As a synthesis we propose the research model of Figure 2 to be tested. The model just combines the model of Figure 1 with the designable qualities introduced in Table 1, distinguishing an object-based belief and an object-based attitude in the case of each designable quality [114].

The horizontal flow in Figure 2 follows Wixom and Todd [114], who propose a model that distinguishes object-based beliefs (system quality and information quality) and object-based attitudes (system satisfaction and information satisfaction) as antecedents of behavioral beliefs (perceived ease of use (PEOU) and perceived usefulness (PU)) and behavioral attitude toward use. However, Figure 2 extends the list of object-based beliefs and object-based attitudes to cover all the seven designable qualities introduced in Table 1. The normal arrows in Figure 2 describe 1-to-1 associations between constructs, whereas the block arrow describes m-to-n associations (m and/or $n \geq 2$).

If one contrasts the model of Figure 2 with TAM and UTAUT, it is obvious that they influence the right hand side of Figure 2 – starting from motives of using IT artifacts. As noted earlier, PB is similar to PU in TAM and performance expectancy in UTAUT, and PCE resembles effort expectancy in UTAUT. Behavioral attitude, behavioral intention and use behavior can be traced to the Theory of Reasoned Action [36] as in TAM.

PEOU from TAM is not directly included in the model, but it is decomposed into usability and PCE. The reason is the discrepancy between the conceptualization of PEOU and its operationalization in TAM. Although [25] defines PEOU in very similar terms as effort expectancy [109], the operationalization of PEOU in [25] is closer to core usability, i.e. ease of use and ease of learning [66, 83], than effort expectancy.[12]

Although one can hypothesize that the two constructs are related so that usability (or usability satisfaction) influence effort expectancy, one should note that the latter may have other antecedents, too.[13]

When compared with these earlier models, the major contribution of Figure 2 is the construct "Perceived Sociability of Use" (as a behavioral belief), which can be conjectured to be particularly relevant in the case of

[12] To give a more concrete idea, items of complexity of use such as "Using XXX takes too much my time" and "The use of the system takes too much time to make it worth the effort" from [106] capture better the idea of effort expectancy than items of PEOU in [25].

[13] Recall also that social influence and facilitating conditions of UTAUT are interpreted as contextual factors not included in the model of Figure 2.

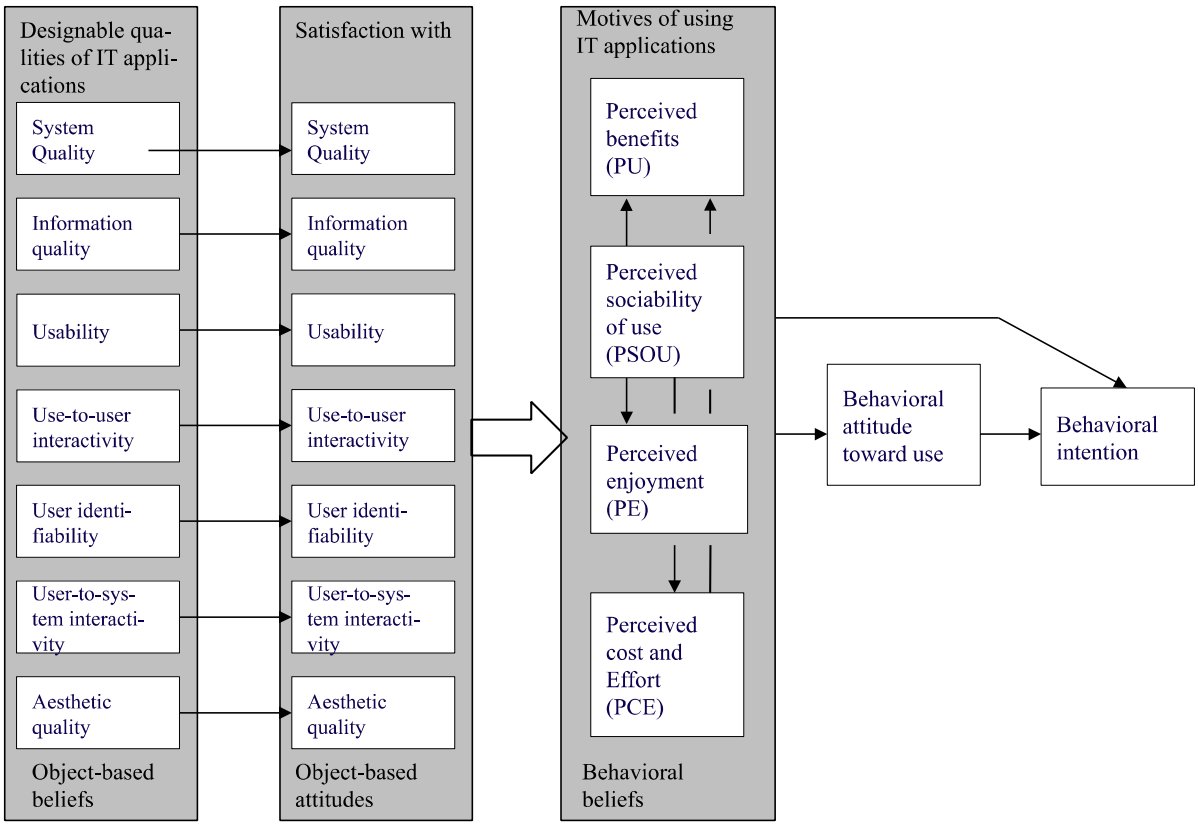

Figure 2: Research Model

CMC applications such as Facebook. The idea is to understand the position of PSOU in the whole nomothetic network, i.e. (1) how it affects PB, PE, PCE, attitude toward use and behavioral intention to use and (2) what designable qualities (system characteristics) explain PSOU.

The latter question in mind Figure 2 also includes a fairly comprehensive set of designable qualities of IT applications (as object-based beliefs) and satisfaction with them (as object-based attitudes) on the left side, although the main interest lies in user-to-user interactivity and user identifiability. As noted before, TAM and UTAUT research has been weak in incorporating designable qualities – they are just considered as external variables whereas in Figure 2 they are focal constructs.[14]

Overall, Figure 2 implies 48 paths - seven between the seven object-based beliefs and the corresponding object-based attitudes, 28 paths between the seven object-based attitudes and the four behavioral beliefs, three paths between PSOU and other three behavioral beliefs (PSOU → PB, PSOU → PE, PSOU → PCE) and eight paths between the four behavioral beliefs and attitude towards use and behavioral intention to use, and one path between attitude towards use and behavioral intention to use. Furthermore, based on TAM [26] there is a path PCE → PB.

The major reason for this complexity is that there is not unified theory or systematic empirical evidence to guide the selection of relevant paths between the seven designable qualities as object-based attitudes and the four behavioral beliefs. Theories from reference disciplines are understandably void of any IT specific substance.

The problem with earlier empirical evidence is that, as far as designable qualities are included, they are investigated individually in isolation from others. For example, usability if interpreted as perceived ease of use has been analyzed in a number of SNS studies (e.g. [50, 54, 64, 72, 80]). Constructs having some

[14] Perceived ease of use in the sense of core usability is the only fairly designable quality of IT applications that has systematically been analyzed in TAM research. Other designable qualities such as system quality, information quality (≈ output quality) are only occasionally included [1, 108, 114].

affinity with user-to-user interactivity are also included in a few SNS studies using different names such as perceived synchronicity [97], telepresence [54] and social presence [17]. Yet, only [54] includes two such designable qualities in one study. This inclusion one by one easily leads to a fragmented research.[15]

Appendix A lists references to empirical support for the 41 tentative propositions related to the paths in the research model, excluding the seven paths between object-based beliefs and object-based attitudes on the left in Figure 2. Most of the paths without any prior evidence are related to PSOU.

Figure 2 implies that this study excludes all contextual factors such as age, gender, experience, education, self-efficacy, facilitating conditions, social influence (norms), self-identity, voluntariness, habits, personality, etc. [101, 109], which may affect directly constructs of Figure 2 or moderate associations therein. Although the latter may significantly increase the variance explained and therefore may be intellectually interesting to include, the primary focus here lies in the designable qualities of IT applications, how they explain the individual use of SNS applications such as Facebook.

2.5 Hypotheses to Be Tested

Table 2 shows the hypotheses to be tested in the empirical part of this work.[16] All of them address associations in which PSOU is involved. Since PSOU has been almost totally neglected in prior research, there is not much empirical evidence in support of the proposed hypothesis. However, our Hypothesis H1 is that satisfaction with user-to-user interactivity is positively associated with PSOU of SNS applications. If a user is dissatisfied with the user-to-user interactivity, (s)he sees that the system somehow fails as a communication medium and therefore in helping him/her to create social contacts and in maintaining them (PSOU). On the other hand, the more (s)he is satisfied with the user-to-user interactivity, the more likely (s)he finds the system to support him/her in creating and maintaining social contacts.

In the case of the relationship between user identifiability and PSOU, one can question if anonymous belonging to a group or a community of anonymous others satisfies the relatedness need to the same extent than belonging to a group or community where the members can be identified. Existing research seem to be contradictory in this respect. As a consequence, we introduce two competing hypotheses (H2.1 and H2.2). Although it is quite uncommon in IS and behavioral sciences more generally to introduce and test competing hypotheses, Short et al. [98] points out that "testing competing hypotheses is a valuable, yet underutilized, form of empiricism" (p. 50). Yet, it is not totally exceptional in IS (see [102] as an example).

Related to H2.1, Lea et al. [57] in their analysis of different degrees of anonymity in the CMC context found that anonymity increased group-based self-categorization, which increased group-based stereotyping of others. Increased group-based self-categorization and group-based stereotyping of others increased group attraction. In other words, according to [57] depersonalization of self and others enhance group attraction. Hypothesis H2.1 reflects this line of reasoning.

Blanchard and Markus [10], on the other contrary, observed individuation from group identity essential in self-identification in a virtual community. They also found self-identification and identifying others essential in building trust and in formation of "sense of virtual community". Hypothesis H2.2 corresponds to this line of evidence.

Table 2: Hypotheses to be tested

H1	Satisfaction with user-to-user interactivity is positively associated with perceived sociability of use (PSOU) of SNS applications
H2.1	Satisfaction with user identifiability is negatively associated with PSOU of SNS applications
H2.2	Satisfaction with user identifiability is positively associated with PSOU of SNS applications
H3	PSOU is positively associated with perceived benefits (PB) of SNS applications
H4	PSOU is positively associated with perceived enjoyment (PE) of SNS applications
H5	PSOU is positively associated with attitude toward use of SNS applications
H6	PSOU is positively associated with behavioral intention to use SNS applications

Hypotheses H3-H6 were argued in detail above. Summarizing briefly, Self-Determination Theory [30] suggests that the relatedness need is associated with extrinsic motivation referring to the process of internalization and integration. Furthermore, the finding that SNS use makes it possible to build social capital [34] and enhance social image [63] can be regarded as an additional reason for hypothesis H3

[15] To illustrate, the seven designable qualities allow 127 different combinations. Isn't it more meaningful to investigate all of them at the same time than to have 127 different studies in which they are included in different combinations?

[16] Note that after Exploratory Factor Analysis (EFA) to be introduced later each of the hypotheses H1-H6 will be decomposed in two, since EFA led to two components of PSOU.

that the PSOU is positively associated with perceived benefits (PB) of SNS applications.

Referring to Hypothesis H4, Self-Determination Theory [30] assumes the relatedness need to be positively associated with intrinsic motivation, although in a more distal sense. As an additional justification one can argue that much of the social interaction satisfying the relatedness need is also intrinsically enjoyable.

One of the tenets of this paper is that social relatedness is not only of instrumental value in supporting extrinsic motivation (PB) and intrinsic motivation (PE), but may directly motivate the use of SNS applications. As a consequence, Hypothesis H5 assumes that PSOU is positively associated with attitude toward use and H6 that it is positively associated with behavioral intention to use of SNS applications.

In order to avoid the specification error this paper includes a representative set of designable qualities as described in Figure 2. For example, PSOU may be affected not only by user-to-user interactivity and user identifiability (Hypotheses H1 and H2), but by other designable qualities as well. Similarly PB and PE may be influenced not only by PSOU (Hypotheses H3 and H4), but by various designable qualities, too.

Furthermore, user-to-user interactivity and user identifiability may also influence other behavioral beliefs in Figure 2. For instance, empirical evidence listed in Appendix A suggests that both user-to-user interactivity and user identifiability may affect PB. A question – not tested in previous research – is whether they influence it directly or possibly indirectly through PSOU. Therefore their role is tested holistically in the context of Figure 2.

3 RESEARCH METHODOLOGY

This paper can be characterized as a field study. It is a quantitative non-experimental study targeted to a special community of Facebook users in a particular region. It is similar to case studies in the sense that it is focused on analytic/theoretical generalizations rather than statistical ones as sample surveys do. The former refer to studies of "some phenomenon in a particular set of circumstances to support, contest, refine, or elaborate a theory, model, or concept" [11]. Yet, it differs from case studies, since it as a quantitative piece of study is based on considerable *a priori* knowledge of what variables are of interest and how they may interact [7].

3.1 Survey

The model introduced above was tested using a questionnaire-based survey. In view of the length of the questionnaire (see Appendix C) the major concern was to assure an acceptable number of responses. It was a fear that a sample survey using random sampling from a population of people, who do not have any personal connection with researchers in question, would lead to a fairly low response rate. For reasons to be explained below, the field study was targeted to Facebook users who have lived or still live in Enontekiö, a municipality in the northwestern part of Finnish Lapland, located 180-350 km north of the Arctic Circle.

The major reasons for selecting Enontekiö for the study were that a M.Sc. student from Enontekiö was interested in doing her thesis on the individual use of Facebook. Because she has worked for years as a study advisor in junior and senior high schools in Enontekiö, she knows quite widely people there. It was believed that a personal connection like that would increase the response rate.

Furthermore, Enontekiö as a very sparsely populated community with a territory of almost 8500 km^2 but with less than 2000 residents is very conducive to the use of SNS applications such as Facebook, especially during the long and dark winter season. The winter is almost 200 days long and the dark season when the sun does not rise above the horizon lasts about 1.5 months.

Because of the long distances in Enontekiö itself and especially between those who have moved elsewhere, communication via SNSs can be expected to be an effective means to keep contact with other people from Enontekiö and to follow what is taking place in their lives. Since it is a small community, people there are not totally strange to each other.

Following Facebook friendship relationships, 576 Facebook users who have lived or still live at Enontekiö were identified. The questionnaire was implemented using Webpropol software so that the 576 users were contacted using Facebook with the request to participate in the survey and with a direct link to web address of the questionnaire.

The data collection was implemented during May 5-20, 2010. 113 acceptable responses were received, leading to a response rate 19.6%. Of the respondents 72 were female and 40 males (one missing). The average age was 32.5 years with the youngest respondent being 12 years and the oldest one 68 years old.

Unfortunately, it is not possible to evaluate the non-response data by comparing early respondents with late ones, since the author does not have data about the time when the link to the questionnaire was sent to each respondent and when the response was received. Neither does the author have demographic data about 576 Facebook users, who were initially identified. Yet, the average age of the 113 respondents is lower than the average age of residents in Enontekiö, which was 45.6 years in 2010 [55], and the women are clearly overrepresented among the 113 respondents when compared with the gender distribu-

tion of citizens in Enontekiö (men 53%, women 47% in 2010 according to the statistics about Enontekiön municipality [35]).

3.2 Measurement of Constructs

The questionnaire was based on standard measures (see Appendix C) as much as possible, the questions being translated into Finnish. The translations back to English attempt to capture the Finnish version as closely as possible.[17]

The questionnaire followed the structure of Figure 2, except that it included a number of priming questions in order to evaluate overall benefits (section O). These priming questions addressed perceived usefulness in work (section L), perceived usefulness at studies (section M), influence on image (section N) as well as potential risks (section F). For brevity reasons these priming questions will not be discussed further in this paper.

In the case of each designable quality (sections A-E, G-H), the last four items adapted from [114] measure the overall quality in question and satisfaction with it, while the preceding questions have a dual purpose. First, they served as priming questions that introduce the respondent to the concept in question. Second, they serve as indicators of the object-based belief in question. The two items used to measure the overall quality (in the case of the seven qualities) will be used only in the validation of the detailed instrument used to measure the quality in question. They will not be used as indicators when testing research model and therefore will not be counted in the following discussion.

The questionnaire includes both reflective (R) and formative (F) measurement of constructs. Formative measurement has aroused considerable attention during a few last years in behavioral sciences and also in IS [13, 52, 78]. In view of the potential problems associated with formative indicators, it is significant to observe that they are applied in the measurement designable qualities on the left in Figure 2 only. Since these object-based beliefs have 1-to-1 associations with corresponding object-based attitudes (satisfaction components), the formative indicators and their possible measurement problems do not influence the paths from the satisfaction components onwards. The value of the formative indicators is that they help to analyze precedents of the satisfaction in more actionable terms as will be illustrated later.

The items of each section - excluding the potential "overall" questions – were subjected to exploratory factor analysis (EFA). This analysis led to refinement of constructs into a number of components ([45], Appendix B). The resultant constructs with their indicators are depicted in Table 3.

The multicollinearity of all formative indicators was assessed using the Variance Inflator Factor (VIF). As Table 3 shows, the VIF values are lower than 3.33 quoted in [78] as a potential standard of acceptable VIF values. Table 3 also reports Cronbach alphas of the reflective constructs. With one exception (the cost component of the PCE constructs) they are clearly acceptable. Moore and Benbasat [75], for example, suggest that in early stages reliabilities in the range of 0.50 – 0.60 would suffice and in any case do not need to exceed 0.80.

Table 3 also shows the means of each construct to give some sense of the absolute values of responses. The means were calculated as averages of the respective items, even of formative constructs, except in the case of multimodality in the context of user-to-user interactivity. There the means of the two items are listed separately.

We also computed cross-loadings of items using PLS (to be explained below) to determine whether each item loaded on its focal construct more than on other constructs. We found one exception: item A4 of system quality, which was deleted. A vast majority of the loadings on the focal constructs (i.e. 79 of 85 loadings) exceeded the value 0.707 [18], four of the eleven violations concerning formative indicators.

3.3 Data Analysis

The preliminary analysis of data described just above was done using SPSS Statistics (version 17.0). The testing of the model of Figure 2 will be conducted using Structural Equation Modeling (SEM) and more specifically using SmartPLS Version 2.0.M3 [89].

There are a number of recent discussions on SEM approaches, contrasting covariance-based SEM such as LISREL and variance-based SEM such as PLS (e.g. [38, 42, 87]). The present paper decided to apply the Partial Least Squares (PLS) approach for three reasons. First, our sample size (n = 113) is too low for covariance-based SEM. Second, testing the complete model using covariance-based SEM might cause problems because of its complexity especially when the sample size is relatively low [42]. Third, PLS is more appropriate when the interest is in prediction and theory development rather than in theory testing [19, 87].

Because of wide and to some extent uncritical application of PLS in IS, Marcoulides and Saunders [70] have expressed concerns about its application as a silver bullet. Their major concerns are sample size, distributional issues and statistical power. If one com-

[17] The Finnish version used the phrase "technical quality" instead of "system quality", since at least in Finnish "system" is easily interpreted to comprise also information content of the system. In this paper we use "system quality" to point the connection to [32].

pares the sample size of this study (113) with the often cited "ten times rule of thumb" requiring that the sample is larger than one of the two possibilities [4, 18]: (1) ten times the number of indicators of the scale with the largest number of formative indicators, or (2) ten times the largest number of structural paths directed at a particular construct in the inner path model. In the complete model to be tested first, constructs have 10 incoming paths at the maximum. In the reduced model to be tested later the maximum number of paths directed to any construct is four. In both models the maximum number of formative indicators is five, i.e. the ratio is more than 20 cases in the reduced model. As will be observed later testing these two models gives very consistent results.

Authors of [70] also advice to focus on distributional properties of the data. In this study skewness of indicators varies between -1.76 - 1.59 and kurtosis between -1.47 – 3.47. Kolmogorov-Smirnov analysis indicates that the statistical distributions of almost all indicators differ significantly from normality. On the hand, theoretically PLS does not impose requirements regarding the distribution of indicators used [87]. Furthermore, [87] reports that not only PLS but also covariance-based SEM applying maxim likelihood estimation is "extremely robust with respect to violations of its underlying distributional assumptions (….) even in extreme cases of skewness and kurtosis" (p. 341). So, no effort was done to normalize the distributions.

Let us discuss statistical power, although it was not used to design sampling in this work. Statistical power – the probability of rejecting a false null hypothesis – in the case of PLS analysis depends on a number of factors – sample size, significance level, effect size, number of indicators, and loadings of indicators [87]. Drawing on [87], Iivari [45] argues that the statistical power in this paper is at least 0.76.

3.4 Common Method Bias

Common method bias is always a risk in a mono-method questionnaire study, in particular when same respondents answer all the questions at the same time. The sample size of this study does not allow any sophisticated statistical tests of the extent of common method bias, not even Harman's one-factor tests, in which all items are included in exploratory factor analysis.

The questionnaire did not include any "marker" variable, which is a theoretical unrelated construct, and it is difficult to find in the questionnaire a suitable surrogate for such a maker variable as exemplified by [77], for example. Yet, as discussed in [45] there were not clear signs of common method bias.

4 RESULTS

Exploratory factor analysis described above led to two components of usability, three components of user-to-system interactivity, three components of user-to-user interactivity, two components of identifiabilty, two components of aesthetics, two components of PSOU and two components of PCE.

The research model of Figure 2 was refined accordingly, leading to 79 paths. Fourteen of them concern the associations between designable qualities as object-based beliefs and object-based attitudes and 65 are paths in the rest of the model. Forty two of the 65 paths are between the seven object-based attitudes and the six components of the behavioral beliefs (i.e. PSOU-1, PSOU-2, PCE-1, PCE-2, PB, PE), ten paths are between the behavioral beliefs (PSOU-1 → PB, PSOU-2 → PB, PSOU-1 → PE, PSOU-2 → PE, PSOU-1 → PCE-1, PSOU-2 → PCE-1, PSOU-1 → PCE-2, PSOU-2 → PCE-2, PCE-1 → PB, PCE-2 → PB), six paths between the six components of behavioral beliefs and attitude toward use, similarly six between the six components of behavioral beliefs and behavioral intention to use, and finally one path between attitude toward use and behavioral intention to use.

Because of the one-to-one correspondence between the seven object-based beliefs and the seven object-based attitudes, the fourteen paths related these associations were tested separately.

Results of testing the total model of 79 paths will be introduced in four parts:

1. Testing the measurement model
2. Testing the model of 65 paths introduced above (called "complete model" below)
3. Reducing the complete model of 65 paths, leading to a reduced model of 20 statistically significant paths.
4. Testing the fourteen paths related to the associations between seven designable qualities as object-based beliefs and object-based attitudes.

4.1 Measurement Model

Henseler et al. [42] suggest that reflective measurement model could be evaluated in terms of five criteria:

1) composite reliability,
2) indicator reliability,
3) average variance extracted (AVE),
4) Fornell-Larcker criterion of discriminant validity,
5) and cross loadings.

Composite reliabilities were clearly higher than the value 0.70 that is generally considered acceptable ([45], Appendix C). With two exceptions

Table 3: Constructs and their measurement

Construct	Items	R/F	VIF	Alpha	N	Mean
System quality (SQ)						
- formative	A1-A3, A5	F	1.2-1.8		112	3.67
- overall	A6-A7	R		0.90	112	3.81
Satisfaction with SQ	A8-A9	R		0.89	112	3.74
Information quality (IQ)						
- formative	B1-B3, B5	F	1.4-2.6		112	3.38
- overall	B6-B7	R		0.92	112	3.38
Satisfaction with IQ	B6-B7	R		0.86	112	3.46
Usability						
- ease of use	C1-C4	R		0.93	112	4.49
- ease of learning	C5-C7	R		0.94	112	5.78
- overall	C8-C9	R		0.95	112	4.50
Usability satisfaction	C10-C11	R		0.94	112	4.31
User-to-user (U2U) interactivity						
- reciprocity	D1-D3	R		0.89	112	5.69
- multimodality	D4, D6	F	1.0-3.2		112	5.85, 2.64
- responsiveness	D7-D8	R		0.82	112	5.11
- overall	D9-D10	R		0.90	112	5.46
Satisfaction with U2U interactivity	D11-D12	R		0.95	112	4.88
User identifiability						
- representability	E1-E4	R		0.89	112	5.62
- hideability	E5-E8	R		0.97	112	4.38
- overall	E9-10	R		0.95	112	4.58
Satisfaction with user identifiability	E11-E12	R		0.92	112	4.47
User-to-system (U2S) interactivity						
- user control	G1-G3	R		0.80	112	5.04
- reciprocity	G5-G7	R		0.91	112	2.69
- responsiveness	G8-G9	R		0.87	112	3.50
- overall	G10-G11	R		0.97	112	3.73
Satisfaction with U2S interactivity	G12-G13	R		0.96	112	3.72
Aesthetics						
- classical	H1-H5	R		0.87	113	4.43
- expressive	H6-H10	R		0.82	113	3.53
- overall	H11-H12	R		0.90	113	3.79
Satisfaction with aesthetics	H13-H14	R		0.89	113	3.93
Perceived sociability of use (PSOU)						
- creating (PSOU-1)	K1, K3, K5	R		0.93	113	4.23
- maintaining (PSOU-2)	K2, K4, K6	R		0.90	113	5.73
Perceived enjoyment (PE)	J1-J4	R		0.90	113	4.75
Perceived benefits (PB)						
- overall benefits	O1-O2	R		0.94	113	4.45
Cost and effort expectancy (PCE)						
- cost (PCE-1)	P1, P4	R		0.59	113	2.35
- time and effort (PCE-2)	P2-P3, P5	R		0.74	113	3.67
Attitude toward use	Q1-Q3	R		0.88	113	5.07
Behavioral intention (BI) to use	R1-R3	R		0.93	113	5.83

Abbreviation: F = Formative, R = Reflective, VIF = Variance Inflation Factor, N = "sample" size

indicator reliability in terms of standardized item loadings of reflective indicators exceeded the value 0.70. The AVE values - with a lowest value 0.59 - also exceeded the threshold value 0.50.

The Fornell-Larcker criterion of discriminant validity [37] requires that the square root of the AVE value of each latent construct should be higher than the correlations with other latent variables. All the reflective constructs of this study demonstrate discriminant validity ([45], Appendix C). As described above, all reflective items also had higher loadings with their focal constructs than with other latent constructs.

The formative measures do not have equally clear criteria. Henseler et al. [42] propose four criteria:

1) nomological validity, i.e. a well-known relationship between a formative constructs and other construct in the path model,
2) external validity meaning that the formative construct explains a big part of the variance of the same construct measured using a reflective indicators,
3) significance of weights, and
4) multicollinearity.

Multicollinearity of formative indicators was tested above (see Table 3), suggesting that the VIF values are acceptable. Of the ten indicators, two did not have significant ($p \leq 0.05$) weights.

The analysis of the relationships between formative measures of system quality, information quality and the multimodality component of user-to-user interactivity with the corresponding components of satisfaction can be considered tests of the nomological validity, although all these relationships are not well-known by prior research. Section 4.4 below confirms these relationships and show that all the formative constructs have significant positive relationships with the corresponding satisfaction components.

Henseler et al. [42] suggest that the external validity of formative indicators could be tested using an alternative reflective measure for a formative construct in question. The first two "overall" questions inspired by [114] in the end of each designable quality (see Appendix C) provide us reflective measures for each quality. We adopted the formula proposed by Henseler et al. [42] to estimate not only external validities of formative constructs, but of all constructs corresponding to the designable qualities (object-based beliefs) in Figure 2. The results ([45], Appendix C) show that the external validities of all designable qualities are below the minimum value 0.80 suggested in [42]. This is not a problem of formative indicators only. For example, the two components of well-validated reflective measure of aesthetics [56] explain 67% of the variance of the overall aesthetic quality leading the value 0.70 for the external validity.

To summarize, especially the formative indicators of this study suffer from some measurement problems – from insignificant weights and low external validity. As noted above, when we remove all object-based beliefs (including formative constructs such as system quality, information quality and multimodality of the user-to-system interactivity) from the model to be tested (see Figure 2), the removal does not change the path coefficients of the remaining model. As a consequence we do not see these measurement problems fatal to this study.

4.2 Structural Model: Testing the Complete Model

The complete model discussed in this section refers to the part of the whole structural model with 65 paths from object-based attitudes onwards to the right in Figure 2, including 15 latent variables. Admittedly the model is complex in terms of paths, but not exceptionally so. Ringle et al. [88], for example, report that MIS Quarterly articles utilizing structural equation modeling techniques at the maximum had 36 latent variables and 64 paths. They do not report how many observations studies had per path, implicitly suggesting that it is not a critical issue.

Table B.1 in Appendix B reports the results (paths 15-79). Table 4 summarizes only the hypotheses tested, significant path coefficients discovered, and the variance explained by the complete model. The models explanatory power is fairly high in the case of attitude toward use (63%), intention to use (64%), perceived enjoyment (50%) and just moderate in the case of perceived benefits (36%), perceived sociability of use (22% for PSOU-1 and 24% for PSOU-2), and perceived cost (PCE-1) (23%). In the case of perceived time and effort (PCE-2) it is clearly low (11%).

As hypothesized (H1), the results show that satisfaction with user-to-user interactivity is a strong predictor of both PSOU-1 (using Facebook to create social contacts) and of PSOU-2 (using Facebook to maintain social contacts). In the case of user identifiability we suggested two contradictory hypotheses H2.1 and H2.2 (see Table 2) that user identifiability has a negative/positive association with PSOU. Although results of Table 4 suggest negative associations with PSOU-1 and PSOU-2, neither of them is significant.[18]

Referring to Hypotheses H3 and H4 (see Table 2), the results of Table 4 are mixed. Although Facebook is used to create social contacts (mean 4.23 in Table 3), PSOU-1 is not a significant predictor of perceived benefits (PB) or perceived enjoyment (PE).

[18] Referring to Section 4.4, one should note that satisfaction with user identifiability is dominated by identity hideability rather than by identity representability.

On the other hand, PSOU-2 is a significant predictor of both PB and PE.

The situation is similar in the case of Hypotheses H5 and H6. PSOU-1 does not have significant direct paths with attitude toward use and intention to use, whereas PSOU-2 has significant positive associations with both of them. So, clearly Facebook is not only used to maintain social contacts (mean 5.73 in Table 3), but this use (i.e. PSOU-2) is a very strong motivator of using Facebook.

Table 4: Testing the Complete Model – Hypotheses Tested and Significant Paths

Path	Beta	R^2
H1a: Satisfaction with user-to-user interactivity → PSOU-1	0.30**	
H2.1a/H2.2a User identifiability → PSOU-1	-0.19	0.22
H1b: Satisfaction with user-to-user interactivity → PSOU-2	0.47**	
H2.1b/H2.2b User identifiability → PSOU-2	-0.08	0.24
PSOU-1 → PCE-1 (cost)	0.37***	
PSOU-2 → PCE-1 (cost)	-0.30*	0.23
Satisfaction with usability → PCE-2 (time and effort)	-0.28*	0.11
Satisfaction with information quality → PB	0.30*	
PCE-2 (time and effort) → PB	-0.27**	
H3a: PSOU-1 → PB	-0.04	
H3b: PSOU-2 → PB	0.33***	0.36
Satisfaction with aesthetics → PE	0.16*	
H4a: PSOU-1 → PE	0.07	
H4b: PSOU-2 → PE	0.40***	0.50
PB → Attitude toward use	0.28**	
PE → Attitude toward use	0.31***	
H5a: PSOU-1 → Attitude toward use	0.05	
H5b: PSOU-2 → Attitude toward use	0.23**	0.63
Attitude toward use → Behavioral intention to use	0.42***	
H6a: PSOU-1 → Behavioral intention to use	0.02	
H6b: PSOU-2 → Behavioral intention to use	0.26*	0.64

* $p \leq 0.05$, ** $p \leq 0.01$, *** ≤ 0.001

Quite interestingly, both PSOU-1 and PSOU-2 are significant predictors of PCE-1 (cost) but not of PCE-2 (time and effort). Furthermore, the influence of PSOU-1 on PCE-1 is positive, whereas the influence of PSOU-2 is negative. These results suggest that maintaining social contacts offsets the perceived costs of Facebook use, while creating social contacts are perceived to increase the costs.

Partly in line with TAM [26], PCE-2 (time and effort) has a significant negative association with PB, but there is no significant association between PCE-1 (cost) and PB. The association between PCE-2 and PB may indicate that the respondents have difficulties to keep separate the benefits of Facebook use and the time and effort required for that use.

Findings of Table 4 also show that four of the seven aspects of satisfaction – satisfaction with information quality, satisfaction with usability, satisfaction with aesthetics, satisfaction with the user-to-user interactivity - have significant path coefficients when testing the complete model. In order to receive a better view, the following section tests the model by removing insignificant paths one by one until all paths are significant.

4.3 Structural Model: Testing the Reduced Model

The reduced model was achieved using the following procedure: If insignificant paths were left in the model, a path with the lowest statistical significance was eliminated in each round. This led to the model of Figure 3, in which all twenty paths are significant ($p \leq 0.05$).

Figure 3 confirms the results of testing the complete model. The use of Facebook to maintain social contacts (PSOU-2) continues to be a central construct – it is a significant determinant of perceived cost (PCE-1), perceived benefits (PB), perceived enjoyment (PB), attitude towards use, and behavioral intention to use. The use of Facebook to create social contacts (PSOU-1) on the other hand continues to be an insignificant determinant of all these constructs except of PCE-1.

The model's explanatory power is still reasonably good. It explains 61% of the variance of attitude toward use, 62% of behavioral intention to use, and 49% of perceived enjoyment and 30% of perceived benefits, 18% of PSOU-1, 20% of PSOU-2, 20% of PCE-1, but only 7% of PCE-2.[19]

In the reduced model six of the seven satisfaction

[19] We also tested a version in which perceived usefulness in work (n = 113) was substituted for perceived benefits. It did explain neither attitude toward use not behavioral intention to use. Similarly perceived usefulness at studying (n = 106) did explain neither attitude nor behavioral intention.

components turn out to be significant, the only insignificant one being satisfaction with system quality. Generally, the paths from the satisfaction components make sense and are fairly easy to interpret. For example, satisfaction with information quality increased perceived benefits (PB), satisfaction with usability had a significant negative association with PCE-2, implying that higher usability reduces the perceived time and effort of using the system. Satisfaction with user-to-system interactivity increased perceived enjoyment (PE) as satisfaction with aesthetics and satisfaction with user identifiability also did. Satisfaction with aesthetics also increased PSOU-1 (support for creating social contacts), perhaps suggesting that the more aesthetic the systems is, the more attractive it also is when creating social contacts. As can be expected user-to-user interactivity was positively associated both with PSOU-1 (support for creating social contacts) and PSOU-2 (support for maintaining social contacts). Perhaps, the negative association between satisfaction with user-to-user interactivity and PCE-1 (perceived cost) is the most difficult to interpret. Might it imply that more satisfied a user is with the user-to-user interactivity, the less the cost is a concern for him/her?

4.4 Structural Model: Designable Qualities as Predictors of Satisfaction

As observed above, satisfaction with six of the seven designable qualities had significant associations in the nomological network of Figure 3. The next question is how the components of satisfaction can be influenced by design. Figure 4 describes the results. In the case of formative constructs also weights of indicators are shown. The results show that typically the designable qualities explain about 50% of the variance of corresponding satisfaction component, satisfaction with user identifiability being an exception, where one of the two factors - identity hideability – is very dominant.

If one looks at results of Figure 4 in more detail, among the four formative indicators of system quality, technical reliability (A1) and the lack of problems with version updates (A3) are dominant. Perhaps surprisingly, information security (A2) does not emerge as a significant predictor.

Contrary to system quality, the indicators of information quality received relatively equal weights, although B3 (information consistency) does not have a significant weight.

In the case of usability, the ease of use (EOU) component is dominant (ß = 0.88), while ease of learning (EOL) has a significant negative path coefficient (ß = -0.19). In view of the relatively high mean of EOL (5.78 in Table 3), it may be that improving EOL has achieved the range of diminishing returns, and EOU with a lower mean (4.49 in Table 3) starts to dominate.

In aesthetics classical aesthetics and expressive aesthetics are fairly equal predictors of satisfaction with aesthetics

Although user-to-user interactivity was found be a significant designable quality, perhaps surprisingly user-to-user reciprocity does not turn out to be a significant predictor of satisfaction with user-to-user interactivity. One explanation could be the high mean value of user-to-user reciprocity (5.69 in Table 3). Item D4 (opportunity to communicate textually) dominates multimodality, although both formative indicators (D4 and D6) have significant weights. In view of the high weight of D4 when compared with D6 (opportunity to communicate through video), the results seem to favor monomodality rather than multimodality. So, the results seem to tell to the developers of Facebook that continue be good in what you are good, i.e. in the text-based communication. However, user-to-user responsiveness with a relatively high mean value (5.11) is the most significant predictor of satisfaction with user-to-user interactivity.

User control and responsiveness are the dominant predictors of satisfaction with user-to-system interactivity, while reciprocity is not significant. The question is if this is somehow related to the low perceptions of reciprocity among the respondents (mean 2.69 in Table 3) when compared with control (5.04) and responsiveness (3.50).

In the case of satisfaction with user identifiability, identitity hideability explains it much more than identity representability. Again the respondents evaluated identity representability (mean 5.62) much higher than with identity hideability (mean 4.38). So, the room and need for improvement may be on the hideability side.

The above detailed discussion illustrates that the focus of designable qualities of Facebook in this paper provides findings that may be applied in the future development of Facebook and similar IT applications. The following section discusses the implications of this paper at a more general level

5 DISCUSSION AND CONCLUSIONS

Social relatedness is one of the basic human needs. Existing research shows that people use SNS application for socializing [12], but earlier quantitative nomothetic research on the individual use of SNSs has largely omitted it. This paper proposed a new construct, Perceived Sociability of Use (PSOU) to capture this social motive of using SNSs and introduced a

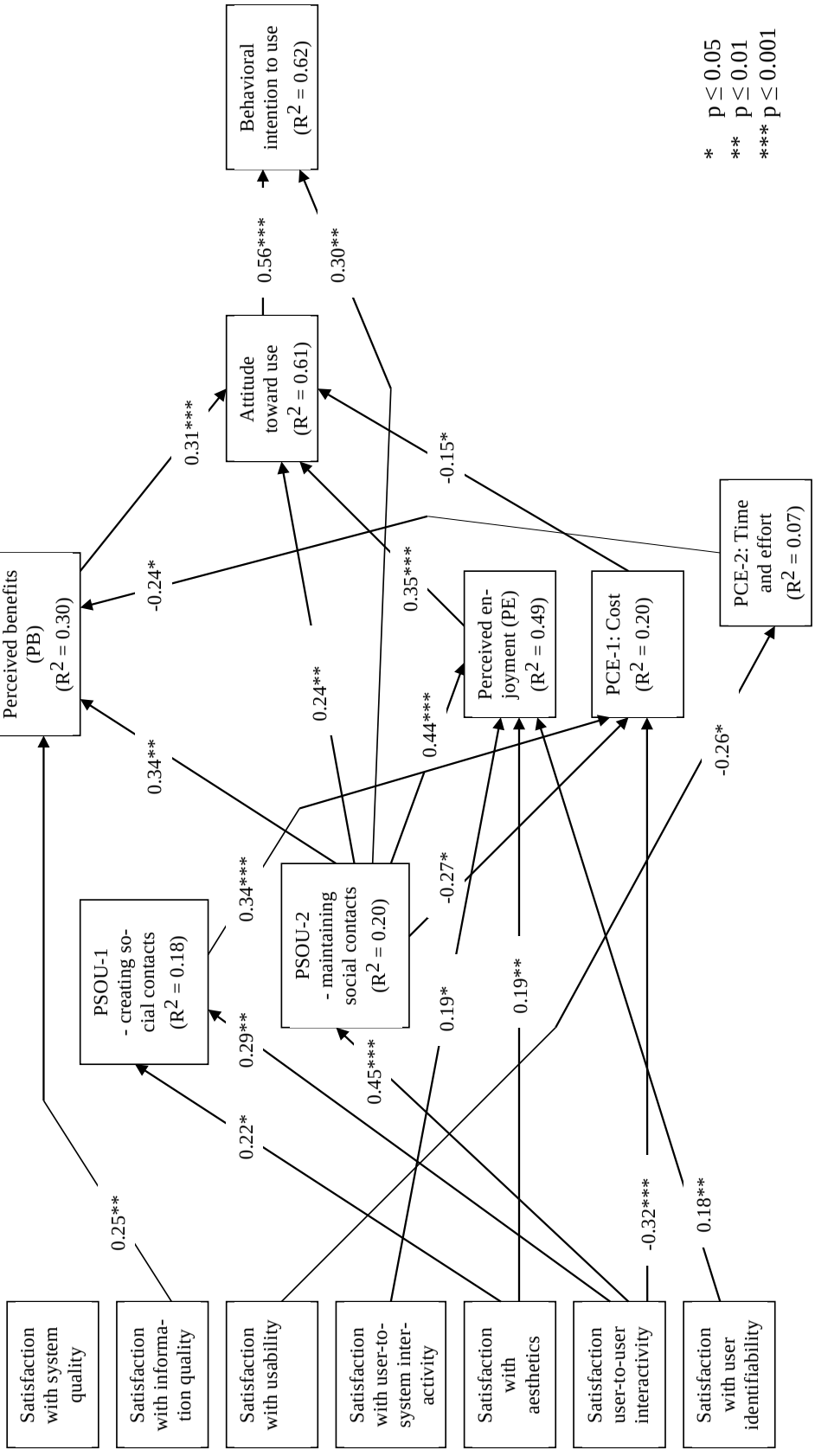

Figure 3: Reduced Model

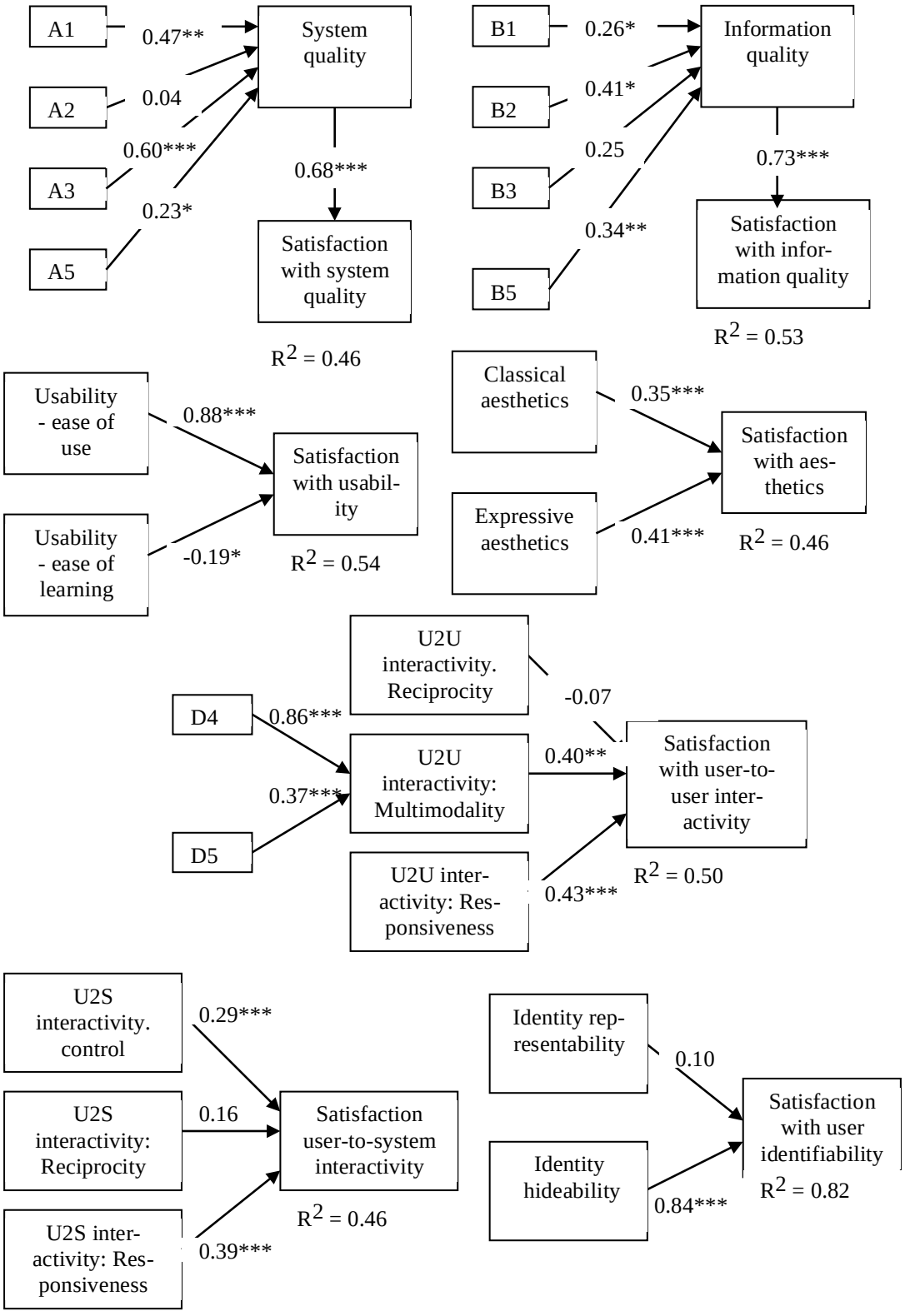

Figure 4: Designable qualities as predictors of satisfaction

research model to examine its antecedents and consequents. The model was tested in a field study of Facebook use in Enontekiö in Lapland.

The test provided strong support for Hypotheses that support for maintaining social contacts (PSOU-2) is positively associated with perceived benefits (H3b), perceived enjoyment (H4b), attitude toward use (H5b), and intention to use (H6b), but corresponding Hypotheses H3a, H4a, H5a and H6a with PSOU-1 (support for creating social contacts) were not supported.

It was also found that satisfaction with user-to-user interactivity is positively associated with both components of PSOU (i.e. PSOU-1 and PSOU-2). In the case of two rival hypotheses H2.1 and H2.2 for the association between user identifiability and PSOU neither of them was supported by the empirical data.

As a whole the paper has clear theoretical and practical implications to be discussed below.

5.1 Theoretical Implications

The paper demonstrates the pivotal role of PSOU-2 (support for maintaining social contacts) in the nomological network. As noted in Sections 1 and 2 prior quantitative nomothetic research on SNSs has omitted PSOU or equivalent constructs.

The significance of this paper is not necessarily limited to typical CMC applications only. The concept of PSOU is potentially relevant in the case of any IT application in which users perceive that they communicate with each other through an IT artifact. Lin and Bhattacherjee [63] discovered in the context of multi-user online video games that "interaction quality", which they define in terms quite similar to PSOU, predicts "social image", but they did no test if it would predict also perceived enjoyment, attitude and usage intention. Junglas et al. [49] found sociability to be a significant predictor of enjoyment in the case virtual fantasy world applications such as Second Life, even though they did not use sociability in the same meaning as the present study. Furthermore, they did no test if sociability might predict usefulness (≈ PB) and ease of use (≈ PCE).

Even the use of traditional information systems may be interpreted to include social interaction. The identity of the user updating the system may be stored as meta-data and communicated to output users so that they can assess the credibility of information sources, for example. More obviously, in the context of knowledge repositories it may be important to identify users (knowledge sources) not only for knowledge credibility reasons but also for motivational reasons (reputation or image of contributing knowledge), although empirical findings in this respect seem to be contradictory [51, 111]. The question is to what extent PSOU may explain their use, especially if the user-to-user interactivity is made more reciprocal, multimodal and more responsive than typically in the current systems.

Because PSOU has largely been omitted in prior research, this paper challenges much of it as the comments on [63] and [49] above imply. As an additional example, Chang and Zhu [16] report that bridging social capital explained SNS continuance intention, but bonding capital did not. Assuming that maintaining social contact (cf. PSOU-2) emphasizes bonding social capital rather than bridging social capital and creating social contacts (cf. PSOU-1) vice versa, the results of this study at least seemingly contradict their findings. One explanation may be that [16] does not include anything like PSOU to study its potential direct effects on SNS continuance intention. Cultural differences may also influence. Choi et al. [20] reports that they are significant in the case of social capital. To have a better understanding of the issue one could have a cross-cultural study, which includes PSOU and expectations of the two forms of social capital as potential determinants of SNS continuance intention.

Focusing on individual use of CMC applications such as IM, MSN and blogs, Chang and Wang [14] found that "Interactivity of online communication", corresponding to user-to-user interactivity, has a strong influence on PU, PEOU and flow experience (resembling perceived enjoyment). Again one can question if the influence of "interactivity of online communication" could have been mediated by PSOU and how the inclusion of PSOU might influence the significance of PU, PEOU and flow experience on attitude toward use and behavioral intention to use.

Wasko et al. [112] report in the context of knowledge repositories that users develop strong ties with the community as a whole rather than develop interpersonal relationships in electronic networks in practice, in which they share knowledge about their occupational practice or common interests. Of course it would have been more convincing if their study would have explicitly included PSOU or a similar construct to test if users perceive that the system helps them create and maintain personal relationships when using an electronic network of practice.[20] Wasko's et al. [112] study also leads to the questions if the ties with the community can satisfy users' sociability need and as a consequence the technology in question helps them to create and maintain social contacts (PSOU).

Finally, this paper illustrates how quantitative nomothetic research can be made more design-oriented so that it can answer questions such as "what

[20] Wasko et al. [112] base their conclusion on the finding that users did not personally know the person who answered their question or they were not acquainted with the individuals whom they were helping with their advice.

makes the system useful", "what makes the system enjoyable to use" and "what makes the system sociable to use". To provide a potential to answer such questions the paper included seven actionable technology/design-oriented qualities (system characteristics) of SNS applications and tested how they may affect perceived benefits, perceived enjoyment and perceived sociability of using Facebook. If more widely adopted, this would imply a significant turn in IS research.

5.2 Practical Implications

Indeed, one of the goals of this paper is to illustrate how traditional nomothetic research can be made design-oriented so that it has actionable practical implications. The empirical analyses of designable qualities above likely represent the most practical implications of this paper. It included a relatively detailed discussion of the possible implications of the study findings. For example, they suggest that developers of Facebook might invest on

- ease of use rather than on ease of learning as aspects of usability,
- multimodality and responsiveness as aspects of user-to-user interactivity rather than on the increased reciprocity,
- identity hideability rather than on indentity representability in the case of user identifiability, and
- user control and responsiveness as aspects of user-to-system interactivity rather than on increased reciprocity,

in order to increase satisfaction with these designable qualities in question.

Yet, we wish to point out that these results should not be interpreted mechanistically, but they should be appropriately interpreted by knowledgeable practitioners.

5.3 Limitations

As any piece of research, this study also has its limitations. First, as a field study it does not aim at statistical generalizations but rather in analytical/theoretical ones. Enontekiö as a community of Facebook users may be specific and therefore the results may not be statistically generalizable. This study also focused on Facebook only. It is an open question to what extent the results can be generalized to cover other SNS applications.

Although the empirical findings provided considerable support for the research model to be tested (see Figure 2), there is a clear need to replicate the study in other contexts focusing on different SNSs possibly including multiple ones. Yet, the initial model (Figure 2) and the resultant reduced model (Figure 3) are generalizable and can be used in research on the individual use of various SNSs in other contexts.

Second, this study suffered from some methodological problems - the sample size was relatively low, it was not possible to evaluate the non-response bias and also it was possible to evaluate the common method bias only in a very limited sense. The study also encountered some measurement problems. Therefore, this empirical test should be considered preliminary rather than conclusive. It is important to conduct comparable studies in other contexts, hopefully with larger samples and with more valid measures.

Thirdly, the paper consciously excluded all contextual variables, putting the priority on actionable technology/design-oriented determinants of SNS application use. Recalling that the essence of IS is neither in technology alone nor in the organizational context alone, but in their mutual interaction [58], there is a clear need to expand research to cover various psychological characteristics of users and other contextual factors [101, 109]. For example, inspired by the related research reviewed above [61, 90, 100], one can include personal characteristics such as strength of extrinsic motivation, strength of intrinsic motivation and strength of relatedness motivation and study how they may moderate the relationships between PB → Attitude toward use, PE → Attitude toward use, PSOU → Attitude toward use, PB → Behavioral intention, PE → Behavioral intention, PSOU → Behavioral intention.

Despite the above limitations it is the author's wish that this paper will serve as an example of design-oriented quantitative nomothetic research and will stimulate IS researchers to pay attention to that line of research. It is the direction IS research should take.

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APPENDIX A

Table A.1: Support for the tentative propositions

	Path	Support
1	System quality +> PB	[1, 114]
2	System quality -> PCE	[1, 114]
3	System quality +> PE	[1]
4	System quality => PSOU	
5	Information quality +> PB	[1, 114]
6	Information quality +> PCE	[1]
7	Information quality +> PE	[1]
8	Information quality => PSOU	
9	Usability +> PB	[74]
10	Usability -> PCE	[26]
11	Usability +> PE	[74]
12	Usability => PSOU	
13	User-to-system interactivity +> PB	[105]
14	User-to-system interactivity /o> PCE	[105]
15	User-to-system interactivity +> PE	[115]
16	User-to-system interactivity o> PSOU	
17	Aesthetic quality +> PB	[23, 107]
18	Aesthetic quality -> PCE	[23, 107]
19	Aesthetic quality +> PE	[23, 107]
20	Aesthetic quality => PSOU	
21	User-to-to user interactivity +> PB	[63]
22	User-to-to user interactivity o> PCE	[81]
23	User-to-to user interactivity o> PE	[115]
24	H1: User-to-to user interactivity +> PSOU	
25	User identifiability +> PB	[67, 86]
26	User identifiability o> PCE	
27	User identifiability => PE	
28	H2: User identifiability +/-> PSOU	[10, 57]
29	H3: PSOU +> PB	[63]
30	H4: PSOU => PE	[49]
31	PSOU => PCE	
32	PCE -> PB	[26]
33	PB +> Attitude toward use	[26]
34	PE +> Attitude toward use	[107]
35	PCE -> Attitude toward use	[26]
36	H5: PSOU => Attitude toward use	
37	PB +> Behavioral intention	[26, 27, 109]
38	PE +> Behavioral intention	[27, 107]
39	PCE -> Behavioral intention	[26]
40	H6: PSOU +> Behavioral intention	[93]
41	Attitude +> Behavioral intention	[26]

Legends: +> a significant positive relationship
-> a significant negative relationship
+/-> mixed results
o> an insignificant relationship
=> any relationship

APPENDIX B

Table B.1: Results of Testing the Complete Structural Model

Path	Beta	R^2
1. System quality → Satisfaction with system quality	0.68***	0.46
2. Information quality → Satisfaction with information quality	0.73***	0.53
3. Usability: Ease of use → Satisfaction with usability	0.88***	
4. Usability: Ease of learning → Satisfaction with usability	-0.19*	0.54
5. U2S interactivity: Control → Satisfaction with U2S interactivity	0.31***	
6. U2S interactivity: Reciprocity → Satisfaction with U2S interactivity	0.14	
7. U2S interactivity: Responsiveness → Satisfaction with U2S interactivity	0.40***	0.46
8. Classical aesthetics → Satisfaction with aesthetic	0.35***	
9. Expressive aesthetics → Satisfaction with aesthetic	0.40***	0.46
10.U2U interactivity: Reciprocity → Satisfaction with U2U interactivity	-0.07	
11. U2U interactivity: Multimodality → Satisfaction with U2U interactivity	0.40**	
12. U2U interactivity: Responsiveness → Satisfaction with U2U interactivity	0.43***	0.50
13. Identity representability → Satisfaction with user identifiability	0.10	
14. Identity hideability → Satisfaction with user identifiability	0.84***	0.82
15. Satisfaction with system quality → PSOU-1	-0.00	
16. Satisfaction with information quality → PSOU-1	-0.09	
17. Satisfaction with usability → PSOU-1	0.13	
18. Satisfaction with U2S interactivity → PSOU-1	0.12	
19. Satisfaction with aesthetics → PSOU-1	0.19	
20. H1a: Satisfaction with U2U interactivity → PSOU-1	0.30*	
21. H2.1a/H2.2a: Satisfaction with user identifiability → PSOU-1	-0.19	0.22
22. Satisfaction with system quality → PSOU-2	-0.14	
23. Satisfaction with information quality → PSOU-2	-0.05	
24. Satisfaction with usability → PSOU-2	0.14	
25. Satisfaction with U2S interactivity → PSOU-2	-0.01	
26. Satisfaction with aesthetics → PSOU-2	0.09	
27. H1b: Satisfaction with U2U interactivity → PSOU-2	0.47**	
28. H2.1b/H2.2b: Satisfaction with user identifiability → PSOU-2	-0.08	0.24
29. Satisfaction with system quality → PB	0.09	
30. Satisfaction with information quality → PB	0.30*	
31. Satisfaction with usability → PB	-0.21	
32. Satisfaction with U2S interactivity → PB	-0.20	
33. Satisfaction with aesthetics → PB	0.18	
34. Satisfaction with U2U interactivity → PB	0.02	
35. Satisfaction with user identifiability → PB	0.03	
36. PCE-1 (cost) → PB	-0.03	
37. PCE-2 (time and effort) → PB	-0.27**	
38. H3a: PSOU-1 → PB	-0.04	
39. H3b: PSOU-2 → PB	0.33*	0.36

(to be continued on the next page)

Table B.1 Continued

Path	Beta	R^2
40. Satisfaction with system quality → PE	-0.01	
41. Satisfaction with information quality → PE	0.09	
42. Satisfaction with usability → PE	0.05	
43. Satisfaction with U2S interactivity → PE	0.15	
44. Satisfaction with aesthetics → PE	0.16*	
45. Satisfaction with U2U interactivity → PE	-0.01	
46. Satisfaction with user identifiability → PE	0.16	
47. H4a: PSOU-1 → PE	0.07	
48. H4b: PSOU-2 → PE	0.40***	0.50
49. Satisfaction with system quality → PCE-1 (cost)	-0.17	
50. Satisfaction with information quality → PCE-1	0.08	
51. Satisfaction with usability → PCE-1	0.00	
52 Satisfaction with U2S interactivity → PCE-1	-0.06	
53. Satisfaction with aesthetics → PCE-1	-0.06	
54. Satisfaction with U2U interactivity → PCE-1	-0.21	
55. Satisfaction with user identifiability → PCE-1	-0.02	
56. PSOU-1 → PCE-1	0.37***	
57. PSOU-2 → PCE-1	-0.30*	0.23
58. Satisfaction with system quality → PCE-2 (time and effort)	0.06	
59. Satisfaction with information quality → PCE-2	0.05	
60. Satisfaction with usability → PCE-2	-0.28*	
61. Satisfaction with U2S interactivity → PCE-2	-0.07	
62. Satisfaction with aesthetics → PCE-2	-0.07	
63. Satisfaction with U2U interactivity → PCE-2	0.02	
64. Satisfaction with user identifiability → PCE-2	0.09	
65. PSOU-1 → PCE-2	0.15	
66. PSOU-2 → PCE-2	-0.21	0.11
67. PB → Attitude toward use	0.28**	
68. PE → Attitude toward use	0.31***	
69. PCE-cost → Attitude toward use	-0.11	
70. PCE-time and effort → Attitude toward use	-0.13	
71. H5a: PSOU-1 → Attitude toward use	0.05	
72. H5b: PSOU-2 → Attitude toward use	0.23**	0.63
73. PB → Behavioral intention to use	0.10	
74. PE → Behavioral intention to use	0.11	
75. PCE-cost → Behavioral intention to use	-0.00	
76. PCE-time and effort → Behavioral intention to use	-0.07	
77. Attitude toward use → Behavioral intention to use	0.42***	
78. H6a: PSOU-1 → Behavioral intention to use	0.02	
79. H6b: PSOU-2 → Behavioral intention to use	0.26*	0.64

APPENDIX C: THE QUESTIONNAIRE[21]

All the items were measured using the Likert scale

Fully disagree__ __ __ __ __ __ __Fully agree

A. Technical quality (≈ [114])

1. Facebook is technically reliable.
2. Information security in Facebook is excellent.
3. Facebook's version updates do not case any technical problems for me.
4. Facebook can easily be adapted to my requirements.
5. It is easy to transfer data between Facebook and other applications I use.
6. Overall, the technical quality of Facebook is excellent.
7. Overall, I would give high rating to the technical quality of Facebook.
8. Overall, I am completely satisfied with the technical quality of Facebook.
9. Overall, the technical quality of Facebook satisfies me completely.

B. Information quality (≈ [114])

1. Facebook provides me a comprehensive source of information.
2. Information in Facebook is correct.
3. Information in Facebook is consistent.
4. Information in Facebook is up-to-date.
5. The format of information in Facebook is excellent.
6. Overall, the information quality of Facebook is excellent.
7. Overall, I would give high rating to the information quality of Facebook.
7. Overall, I am extremely satisfied with the information quality of Facebook.
8. Overall, the information quality of Facebook satisfies me completely.

C. Usability [66]

1. Facebook is easy to use.
2. Facebook is simple to use.
3. Facebook is user friendly.
4. Using Facebook requires the fewest steps possible to accomplish what I want to do with it.
5. I learned to use Facebook quickly.
6. I easily remember how to use Facebook.
7. It is easy to learn to use Facebook.
8. Overall, the usability of Facebook is excellent.
9. Overall, I would give high rating to the usability quality of Facebook .
10. Overall, I am completely satisfied with the usability of Facebook.
11. Overall, the usability of Facebook satisfies me completely.

D. User-to-user interactivity

1. Facebook gives me an opportunity for simultaneous 2-way communication with other people/users.
2. Facebook gives me an opportunity to receive immediate feedback from people/users.
3. Facebook gives me an opportunity to answer immediately to other people/users.
4. Facebook gives me an excellent opportunity to communicate with other people/users textually.
5. Facebook gives me an excellent opportunity to communicate with other people/users through audio.
6. Facebook gives me an excellent opportunity to communicate with other people/users through video.
7. Facebook gives me an opportunity for fast communications with other people/users.
8. Facebook gives me an opportunity to communicate with other people/users without delays.
9. Overall, Facebook provides an excellent opportunity to communicate with other users/people.
10. Overall, I would give high rating to the opportunity to communicate with other users/people provided by Facebook.
11. Overall, I am completely satisfied with the opportunity to communicate with other users/people provided by Facebook.
12. Overall, the opportunity to communicate with other users/people provided by Facebook satisfies me completely.

E. User identifiability

1. Facebook gives me sufficient means to represent my identity (such as name, photo, address and contact information).
2. Facebook gives me means to represent my identity in the way I like.
3. Facebook gives me sufficient means to introduce myself (such as hobbies, interests, work and educational background).
4. Facebook gives me means to introduce myself in the way I like.
5. Facebook gives me sufficient means restrict the visibility of my personal information.
6. Facebook gives me means to restrict the visibility of my personal information in the way I like.
7. Facebook gives me sufficient means to hide my identity.
8. Facebook gives me means to hide my identity in the way I like.
9. Overall, user the means Facebook provides me to represent information about myself, restrict its visibility and hide it is excellent.

[21] Items that are used just for priming are depicted by the asterisk (*)

9. Overall, I would give high rating to the means Facebook provides me to represent information about myself, restrict its visibility and hide it.
10. Overall, I am completely satisfied with the means Facebook provides me to represent information about myself, restrict its visibility and hide it.
11. Overall, the means Facebook provides me to represent information about myself, restrict its visibility and hide it of Facebook satisfies me completely.

F. Potential risk (≈ [28])

1. I am afraid of that my personal information in Facebook can be rendered to outsiders without my consent.*
2. I am afraid of that my identity information in Facebook may be stolen and abused.*
3. I am afraid of that my actions in Facebook may lead to unpleasant rumors and gossip about me.*
4. I am afraid of that my actions in Facebook may lead to harassment on me.*
5. I am afraid of that my actions and statements in Facebook may be used against me in the future.*

G. User-to-system interactivity

1. When I visit Facebook I can freely decide what I do there.
2. When I visit Facebook I can freely decide what I see there.
3. When I visit Facebook I can freely decide what I experience there.
4. Using Facebook is a-2-way process between Facebook and me.
5. When using Facebook I feel as if I would converse with it.
6. When using Facebook I feel as if Facebook would give me immediate feedback.
7. When using Facebook I feel as if Facebook would expect me to continue the conversion with it.
8. Interaction with Facebook is fast.
9. Facebook responses rapidly on my actions.
10. Overall, my interaction with Facebook is excellent.
11. Overall, I would give high rating to my interaction with Facebook.
12. Overall, I am completely satisfied with my interaction with Facebook.
13. Overall, the interaction with Facebook satisfies me completely.

H. Aesthetics [56]

1. The design, appearance and user interface of Facebook is aesthetic.
2. The design, appearance and user interface of Facebook is pleasant.
3. The design, appearance and user interface of Facebook is clear.
4. The design, appearance and user interface of Facebook is clean.
5. The design, appearance and user interface of Facebook is symmetric.
6. The design, appearance and user interface of Facebook represents creative design.
7. The design, appearance and user interface of Facebook represents fascinating design.
8. Facebook has impressive special effects.
9. The design, appearance and user interface of Facebook represents original design.
10. The design, appearance and user interface of Facebook is represents sophisticated design.
11. Overall, the aesthetics of Facebook is excellent.
12. Overall, I would give high rating to the aesthetics Facebook.
13. Overall, I am completely satisfied with the aesthetics of Facebook.
14. Overall, the aesthetics of Facebook satisfies me completely.

J. Perceived enjoyment (≈ [44])

1. The use of Facebook is enjoyable.
2. The use of Facebook's is exciting.
3. The use of Facebook is fun.
4. The use of Facebook's is entertaining.

K. Perceived sociability of use

1. When using Facebook I create acquaintance relationships.
2. When using Facebook I maintain acquaintance relationships.
3. When using Facebook I create relationships with comrades.
4. When using Facebook I maintain relationships with comrades.
5. When using Facebook I create relationships with friends.
6. When using Facebook I maintain relationships with friends.

L. Perceived usefulness in work [25]

Are you currently in working life? 1 = yes, 2 = no

If you are in working life, please answer the following six questions:

1. Using Facebook enables me to accomplish my tasks at work more quickly.*
2. Using Facebook improves my job performance.*
3. Using Facebook increases my productivity art work.*
4. Using Facebook enhance my effectiveness on job.*
4. Using Facebook make it easier to do my job.*
5. I find Facebook useful in my job.*

M. Perceived usefulness at studies (≈ [25])

Do you currently study in some educational institute? 1 = yes, 2 = no

If you study, please answer the following five questions

1. Using Facebook enables me to accomplish tasks related to my studies more quickly.*
2. Using Facebook improves my performance when studying.*
3. Using Facebook increases my productivity when studying.*
4. Using Facebook makes it easier to do tasks related to my studies.*
5. I find Facebook useful in my studies.*

N. Influence on image (≈ [75])

1. Active involvement in Facebook improves my image in the communities important to me.*
2. Active involvement in Facebook improves my value in the communities important to me.*
3. Active involvement in Facebook improves my prestige in the communities important to me.*
4. Involvement in Facebook is a status symbol for me in the communities important to me.*

O. Overall benefits

1. Overall, Facebook is useful to me.
2. Overall, I benefit a lot from using Facebook.

P. Perceived cost and effort

1. Using Facebook costs too much to me.
2. Using Facebook takes too much my time.
3. Using Facebook requires too much effort from me.
4. Using Facebook in not worth its costs.
5. Using Facebook in not worth the effort.

Q. Attitude toward use (≈ [109])

1. Using Facebook is a good idea.
2. Using Facebook is a worthwhile ide.
2. I like using Facebook.

Q. Behavioral intention to use (≈ [109])

1. I plan to use Facebook in future, too.
2. 1. I intend to use Facebook in future, too.
3. I expect that I will use Facebook in future, too.

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