JYU DISSERTATIONS 327

Dicle Berfin Köse

Dual Information Systems

The Complicated Relationship of Hedonic and Utilitarian Values

UNIVERSITY OF JYVÄSKYLÄ
FACULTY OF INFORMATION TECHNOLOGY

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"Who are you?" said the Caterpillar.

This was not an encouraging opening for a conversation. Alice replied, rather shyly, "I—I hardly know, Sir, just at present—at least I know who I was when I got up this morning, but I think I must have been changed several times since then."

"What do you mean by that?" said the Caterpillar, sternly. "Explain yourself!"

"I can't explain myself, I'm afraid, Sir," said Alice, "because I am not myself, you see."

—Lewis Carroll, Alice in Wonderland, 1865

ABSTRACT

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The difference between information systems (IS) according to their use purpose (e.g., hedonic vs. utilitarian and work vs. leisure) is becoming increasingly vague. The growing use of mobile services, the emergence of Web 2.0 and its corollary user-generated content, and design strategies such as gamification have blurred the reasons why people engage with a system. Therefore, many IS can now be considered dual systems used for both pleasure and instrumentality according to the context of use. Although theoretically not fully cultivated, the duality of IS is not an entirely new idea, and for about four decades, the role of computers in combining both work and play has been recognized. Video games and metaphors are the initial sources of inspiration for combining fun and utility in this context, and this approach has been represented in different ways such as funology, ludic design, games with a purpose, serious games, and pervasive games. Nevertheless, many studies still view dual systems as only pleasure- or utility-oriented. A non-cognizance of the duality of IS may result in the development and analysis of these systems in a skewed manner. Therefore, in the IS field, revising the conceptualization and understanding of the use of dual IS is necessary. Considering this identified research gap and its importance, this thesis aims to update the current knowledge regarding dual IS. This thesis also examines the influential factors that affect the use of dual IS but have been ignored in the extant literature. To investigate these factors, both qualitative and quantitative research methods were used. The results of this thesis show that IS are conceptualized differently in a continuum of pleasure and utility. According to this conceptualization, various resources are used to attain utility or fun from the use of IS. Content is an important resource that enables these differing benefits. The theoretical contribution of this thesis stems from providing an updated view on dual IS, the conceptualization of users' varying conceptions of a system, and the analysis of previously unstudied relations between various antecedents of system use in the context of dual IS. The results provide practical implications particularly for the design of IS.

Keywords: dual information systems, hedonic, utilitarian, social networking services, gamified services, adaptation, user's conception, content, habit, mixed methods, social media data analysis

TIIVISTELMÄ

Köse, Dicle Berfin
Monikäyttöiset tietojärjestelmät: hedonistisien ja utilitaristisien arvojen mutkikas suhde
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Tietojärjestelmien välillä oleva ero, joka syntyy niiden käyttötarkoituksesta (esim. utilitaristinen tai hedonistinen, hyöty tai huvi), heikentyy nopeasti. Mobiilitekniikan lisääntyvä käyttö, Web 2.0:n syntyminen ja sen mahdollistama käyttäjän luoma sisältö, suunnittelustrategiat kuten pelillistäminen ovat hämärtäneet syitä, miksi ihmiset käyttävät teknologioita. Sen takia monia teknologioita voidaan pitää monikäyttöisinä; niitä voidaan käyttää huvi- ja hyötytarkoituksessa samanaikaisesti tai erillisesti kontekstin mukaan. Vaikkei olekaan kehittynyt paljon teoreettisesti, tietojärjestelmien monikäyttöinen luonne ei ole uusi ajatus. Jo noin neljän vuosikymmenen ajan on myönnetty, että tietokoneet yhdistävät työn ja pelit. Videopelit ja metaforat ovat ensimmäisiä inspiraation lähteitä huvin ja hyödyn yhdistämiseksi tässä kontekstissa. Tämä asenne on esitetty eri tavoin kuten funologia, pelillinen suunnittelu, tarkoituksen omaavat pelit, hyötypelit, kaikkialle leviävät pelit. Siitä huolimatta monet tutkimukset vielä pitävät monikäyttöisiä tietojärjestelmiä joko utilitaristisina tai hedonistisina järjestelminä. Tietämättömyys tietojärjestelmien monikäyttöisestä luonteesta voi tuottaa virheellisiä tuloksia näiden järjestelmien kehittämisessä ja analyysissa. Siksi on tarpeen tarkistaa ja korjata monikäyttöisen tietojärjestelmän käsitettä. Ottaen huomioon tämän tutkimusvajeen tämä väitöskirja päivittää nykytieteen käsitettä monikäyttöisestä tietojärjestelmästä. Väitöskirja myös tutkii tekijöitä, jotka vaikuttavat monikäyttöisten tietojärjestelmien käyttöön mutta jotka ovat jääneet ottamatta huomioon aiemmissa tutkimuksissa. Tätä varten sekä laadullisia että määrällisiä metodeja on käytetty. Tämän väitöskirjan tulokset osoittavat, että tietojärjestelmiä on käsitelty erillisesti hedonistisen ja utilitaristisen jatkuvuuden välillä. Uudistetun käsitteen mukaan tietojärjestelmien käytössä erilaisia resursseja on käytetty huvia tai hyötyä varten. Sisältö on tärkeä resurssi, joka mahdollistaa erilaisia etuja. Tämän väitöskirjan teoreettisia kontribuutioita ovat käyttäjän eri näkökulmien käsitteleminen ja erilaisten aiempien vaikutusten tarkistaminen monikäyttöisten tietojärjestelmien kontekstissa. Tulokset hyödyttävät teknologioiden suunnittelijoita.

Avainsanat: monikäyttöinen tietojärjestelmä, hedonistinen, utilitaristinen, yhteisöpalvelu, pelillistetty tietojärjestelmä, mukautuminen, käyttäjän käsitys, sisältö, tapa, sekamenetelmien tutkimus, sosiaalisen median tietojen analysointi

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Dicle Berfin Köse

FIGURES

TABLES

LIST OF INCLUDED ARTICLES

I. Köse, D. B., Semenov, A., and Tuunanen, T. 2018. "Utilitarian Use of Social Media Services: A Study on Twitter," Proceedings of the 51st Hawaii International Conference on System Sciences, pp. 1046–1055.

II. Köse, D. B., and Hamari, J. 2019. "Dual Information Systems: A Review Of Factors Affecting Their Use," In Twenty-fifth Americas Conference on Information Systems (pp. 1– 10). Cancún.

III. Köse, D. B., Morschheuser, B., and Hamari, J. 2019. "Is It a Tool or a Toy? How User's Conception of a System's Purpose Affects Their Experience and Use," International Journal of Information Management (49), pp. 461–474.

IV. Köse, D. B. 2020. "Rolling or Scrolling? The Effect of Content Type on Habitual Use of Facebook," Twenty-Fourth Pacific Asia Conference on Information Systems, Dubai, UAE.

CONTENTS

1 INTRODUCTION

Contemporary information systems (IS) owing to their flexible nature can be used for different purposes in different contexts. An epitome of these systems is social media services such as the social networking sites Facebook and Twitter. With the emergence of Web 2.0 and its corollary user-generated content, these services have provided users with flexibility in their interaction with the system. For instance, people can use Instagram and Twitter to post advertisements, Facebook is used as a marketplace to buy and sell goods (Griffin 2016), and Twitch broadcasters earn money through tips, subscriptions, or sponsorships (Whittaker 2015). Another example of such contemporary technologies is gamified systems (e.g., Fitocracy, Pokemon Go, and CodeSpells), where gamification is used to enhance the fun appeal of otherwise utility-oriented systems to motivate people toward more sustained system use. Through such technological developments, an increasing number of IS can be used to serve a mixture of utility and fun purposes. These types of systems are called dual IS (e.g., Chesney 2006; Wu and Lu 2013): systems that are used for both pleasure and utility simultaneously or separately according to the context of use. The widespread use of these systems necessitates that they are conceptualized in an established manner and that the factors affecting their use are well understood because non-cognizance of IS from a duality perspective may be a detriment to their success in the long-run.

Previous research on dual IS mainly focused on four streams. The first stream concentrated on the adoption of dual IS (e.g., see Childers et al. 2001). The second stream studied the continued use intentions for these systems using various theoretical perspectives (e.g., Hamari and Koivisto 2015; Hsu et al. 2014). The third stream conducted meta-analyses to study the comparative effects of intrinsic and extrinsic benefits on use intention and actual usage across system types (e.g., Gerow et al. 2013; Wu and Lu 2013). The fourth stream compared how the explanatory power of different factors changed between the utilitarian and hedonic use of the same system (e.g., Lee et al. 2014).

In these research streams, dual IS were conceptualized differently. In addition, various systems that now provide both hedonic and utilitarian benefits

were classified as hedonic- or utilitarian-only systems. For instance, digital games were seen as hedonic systems without considering their subcategories (Storgards et al. 2009). Moreover, dual IS remained unstudied from several theoretical and practical viewpoints. First, the IS use lifecycle comprises of four main stages: exposure, adoption, continuation, and discontinuation (Soliman and Rinta-Kahila 2020). Among these stages, the discontinuation of dual IS has been ignored in the extant literature. Second, mainstream IS research has ignored the information aspect of IS (Iivari 2017); this is also the case for dual IS.

The research objective of this study is to reconceptualize dual IS and study their use from both hedonic and utilitarian perspectives. Concerning their use, the focus is mainly on the information artifact and discontinuation stage of the IS use lifecycle that have been largely neglected in previous research. To achieve this objective, a pragmatist research approach that embraces both positivism and interpretivism was adopted. Research methodology included the use of mixed methods: qualitative and quantitative methods. In this way, the weaknesses of one approach was covered by the others and different perspectives of dual IS were obtained.

From a theoretical perspective, the research benefited from the conceptualization of the IS artifact by Iivari (2017), technology acceptance model (TAM) (van der Heijden 2004), service science (Vargo and Lusch 2004, 2008), the structuration theory (ST) (Giddens 1984), and the expectation-confirmation theory (ECT) (Bhattacherjee 2001; Bhattacherjee and Lin 2014).

In Article I, a theoretical model was developed to explain the adaptation of IS to provide both hedonic and utilitarian benefits. This was followed by a literature review on dual IS and the factors affecting their use (Article II). These studies showed that people viewed and used contemporary technologies differently, and one of the enablers of this difference was the content available on these systems. Articles III and IV focused on these aspects: Article III analyzed how a user's conception of a system's purpose affected their use intentions toward the system, and Article IV analyzed how content type in a dual system affected system use.

The central claim of this thesis is that contemporary technologies increasingly cater to both fun and utility. Therefore, they should be analyzed from the perspective of dual IS. During this analysis, different factors affecting their use should be considered, with a particular focus on the information artifact that has so far been neglected.

1.1 Background and Research Environment

Today, dual IS encompass an increasing number of systems. This is because of not only the feature set of these systems per se but also their flexibility of use for different purposes. In other words, these systems can be used differently according to users' varying interpretation of them in terms of their features and capabilities and the benefits they offer.

Under the concept of dual IS, two types of systems were studied in this thesis: social networking services and gamified services. Both system types have been viewed differently in the literature. For instance, previous meta-analysis research classified social networking sites as hedonic systems, and gamified services are not mentioned in these studies (Gerow et al. 2013; Wu and Lu 2013). However, these two system types are rapidly proliferating to different domains. Social networking sites are used by different groups (businesses, celebrities, internet celebrities, grassroots, etc.) for different purposes. Similarly, gamification is used in a growing number of areas, including education, exercise, enterprise resource planning, commerce, environmental behavior, and governmental services (Koivisto and Hamari 2019), and gamified services are increasingly viewed as dual IS (e.g., Hamari and Koivisto 2015; Liu et al. 2017). Owing to the rapid spread of these two system types and their transforming multipurpose nature, they are well-fitted for the study of dual IS and for updating its theoretical basis.

Social networking services provide users with spaces where they can create personal information profiles, give others access to these personal profiles, and communicate with others in different forms. They are a class of social media built on the technological and ideological foundations of Web 2.0 and enable user-generated content to be created and exchanged (Kaplan and Haenlein 2010). Social networking services comprise of seven functional building blocks: identity, presence, relationships, conversations, sharing, reputation, and groups (Kietzmann et al. 2011). According to a report by Hootsuite, in 2019, there were 3,725 billion active social media users worldwide, and Facebook was the third and Twitter was the sixth most visited website globally based on total website traffic (Hootsuite Inc. 2020). In Finland, the numbers verify the popularity of social media: 3.3 million monthly active users, with Facebook and Twitter being two of the most visited websites (Hootsuite Inc. 2020).

Regarding gamification, its proliferation is attributable to the belief that it motivates people in activities that need perseverance and long-term commitment (Koivisto and Hamari 2019). Gamification achieves this by creating a meaning and purpose within the activity itself—in other words, by creating a sense of autotelism. This sense of self-purposefulness is achieved by enriching these systems with game design features and hence increasing their qualities of being engaging and immersive. Nevertheless, what is a gamified system and what is not depends on the viewpoint. Deterding et al. (2011) view gamification from the parts/whole and playing/gaming dimensions and define it as "the use of game design elements in non-game contexts" (p. 10). In contrast, Huotari and Hamari (2017) emphasize the user experience in their definition: "Gamification refers to a process of enhancing a service with affordances for gameful experiences in order to support users' overall value creation" (p. 25). These two definitions classify, for instance, serious games, games with a purpose, and pervasive games differently with regard to gamification.

1.2 Objectives and Scope

The aim of this thesis is to modernize the understanding of dual IS and to study the previously ignored factors that may influence their use. More specifically, the objective is to shed light on the adaptation of IS to dual IS and to study its enablers and antecedents, particularly with respect to their effects in the post-adoption stage of the IS lifecycle. The focus is on social networking and gamified services. These systems are analyzed on the individual level instead of the organizational level and in different stages using discreet data and methods.

These studies are presented in separate articles (Articles I–IV). Each article investigates a research question; together, the four articles form the thesis. The research questions and the related articles are as follows:

RQ 1 What resources contribute to the utilitarian use of IS, particularly social media services? (Article I)

RQ 2 What factors affect the adoption and post-adoption of dual IS? (Article II)

RQ 3 How does a user's conception of the purpose of a dual system affect their use intentions? (Article III)

RQ 4 How does hedonic and utilitarian content affect the use of a dual system? (Article IV)

The thesis first shows how social networking services, which were hitherto classified as hedonic systems, are also used for utilitarian purposes. It develops a theoretical model for the adaptation of IS to dual IS and demonstrates that content contributes to different (utilitarian and hedonic) uses of social media services. Next, it reviews the literature on dual IS and presents two models regarding the factors affecting the adoption and post-adoption intentions of dual IS. These models reveal that the information artifact is mostly ignored in the extant literature. The review also shows that an increasing number of systems are viewed as dual-purposed. The results of Articles I and II suggest that dual IS are viewed and used differently. Hence, the following focus of the thesis (Article III) is whether and how a user's conception of the purpose of a dual system affects their use intentions toward the system. Finally, the thesis (Article IV) focuses on content and its effects based on the results of Articles I and II, which show that the information artifact (e.g., content) was overall ignored in the extant literature although it enables discreet uses of a system. Accordingly, in Article IV, the effects of content type on the use of social networking services are studied. Figure 1 displays the connections between the articles and how their motivations are affected by the results of the articles preceding them.

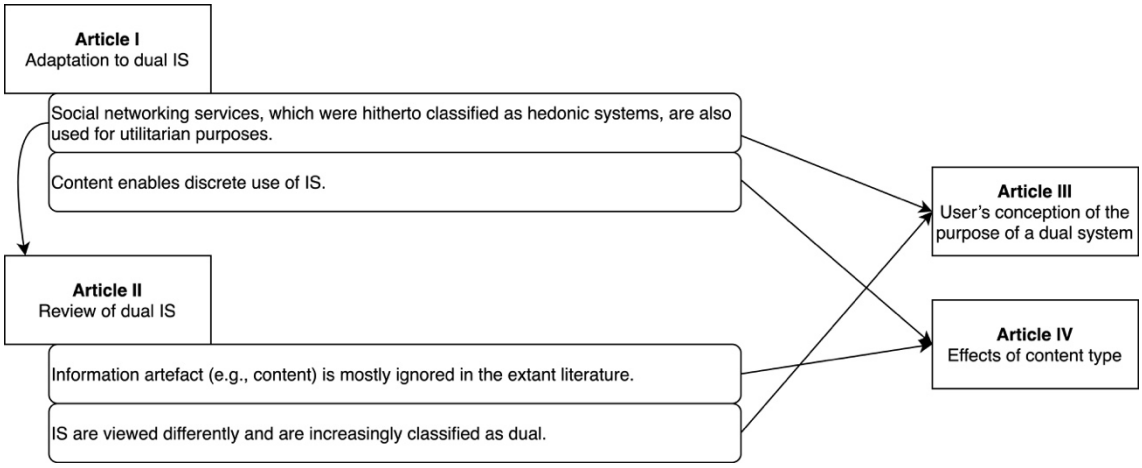

FIGURE 1 The connections between articles in terms of results and motivations

RQ 1 and Article I. Social networking services have been mainly seen as hedonic systems that are used for leisure pursuits. However, their use has diversified to a significant extent: they are now also used for various utilitarian purposes by different stakeholders. Therefore, it is necessary to study their varying use cases, the enablers of these use cases, and the transformation of these services to provide both hedonic and utilitarian benefits. To this end, Article I analyzes the use case of sponsored advertisements that provide monetary gains to their publishers. The resources enabling this use case are investigated, and a model explaining the adaptation of social media services to dual systems is proposed.

RQ 2 and Article II. The concept of dual IS is largely ignored in the literature. Many studies still approach contemporary technologies as either hedonic-only or utilitarian-only systems. Therefore, the studied constructs (i.e., in the research models) may be biased toward one use case and may ignore other types of use cases. Therefore, Article II, through a literature review, aims to provide an outlook of the factors influential in the use of dual IS. In this way, the study also reviews those systems that are viewed as dual systems. Two research models are presented: one for the adoption and the other for the continued use of dual IS.

RQ 3 and Article III. Users may conceive the same system differently. Some may view them as a system for entertainment and others may only use it if it is useful to an end. This is particularly the case for dual IS. These systems can be interpreted differently by users based on their background, preferences, interests, etc. These differing views of the same system may affect users' experience and use of the system. In Article III, users' implicit classification of the system—user's conception of the system—and its interaction with the effects of perceived benefits on their use intentions are explored. The results provide design implications for practitioners with regard to tailorable user interfaces.

RQ 4 and Article IV. Information system artifacts are compounds of information artifact, information technology (IT) artifact, and social artifact. Among these, the information artifact remains relatively understudied. However, today, users are bombarded with information in different forms, such as content on social media or notifications on smartphones. This content has an important

influence on how users interact with a system. In Article IV, hedonic and utilitarian content and its effects on satisfaction, habitual use, use intensity, and discontinued use intention are investigated. The context of the study is another dual information system: the social networking service Facebook.

Table 1 provides an overview of the thesis. This thesis is only an attempt to update the current knowledge regarding dual IS and to draw attention to the factors that affect their use; it neither fully covers the phenomenon nor attempts to do so. Therefore, it offers avenues for future research.

The remainder of the thesis is organized into four main sections. Following the introduction, section 2 provides the theoretical background. Sections 3 discusses the research approach and describes the methodology. Section 4 summarizes the individual articles and their findings. Section 5 discusses the theoretical and practical implications and presents the limitations and possible avenues for future research. The original research articles are attached at the end of the thesis.

TABLE 1 Thesis at a glance

Article	Objective	Method	Findings	Contribution
Article I Utilitarian use of social networking service Twitter through sponsored advertisements	To find out what kind of resources are used by the profiles that post sponsored advertisements	Social media data analysis that combines both quantitative and qualitative methods	- Social networking services are used not only for hedonic but also for utilitarian benefits. - Resources outside of the information system also contribute to the utilitarian use of the system. - Content is an enabler of divergent use of IS.	- Theorization of adaptation of information systems to provide both hedonic and utilitarian benefits.
Article II Factors influential on the use of dual IS	To review the factors that were observed to be influential on the use of dual IS.	Systematic literature review	- There is an increasing number of IS that are regarded as dual-purposed. - Factors related to information artefact have received less attention in comparison to information technology and social artefact.	- An overview of dual IS and the factors influential on their use.
Article III User's conception of dual IS and its effect on the use of the system	To investigate the effects of user's conception of the purpose of a dual system.	Quantitative method: survey and partial least squares structural equation modelling analysis	- User's conception of the system's purpose is an influential construct. - The more fun-oriented users conceive the system to be, the more enjoyment affects their continued and discontinued use intentions, and the less ease of use affects their continued use intention.	- Theorization of the user's conception construct - Examining previously unexplored interaction between user's conception and perceived benefits on their effect on post-adoption intentions.
Article IV The effects of content type on habitual use of dual IS	To find out the relation between content type and habitual use, use intensity and discontinued use intention.	Quantitative method: survey and partial least squares structural equation modelling analysis	- Hedonic content is more influential on habit and satisfaction. - Habit affects use intensity positively but has no significant effect on discontinued use intention. - Satisfaction affects discontinued use intention negatively, but has no significant effect on use intensity.	- Examining previously unexplored relationships between content type and habitual use, use intensity and discontinued use intention.

2 THEORETICAL FOUNDATION

This section presents the theoretical foundation of this thesis and is divided into four subsections. The first subsection provides background information about IS artifacts. In this way, a theoretical foundation for the review on dual IS (Article II) is provided, and the readers are reminded that the information artifact is also a component of IS (although it has been neglected in previous research). The second subsection presents studies related to the adaptation of IS. With this section, it is shown that the theoretical model for the adaptation to dual IS (Article I) fills a theoretical gap. The third subsection discusses dual IS with the aim of comparing and contrasting the existing views on the phenomenon while keeping in mind their weaknesses and strengths and establishing a more comprehensive definition for dual IS. The final subsection provides background information about the post-adoption intentions and system use that constituted the main dependent variables in the individual articles (Articles III and IV). For a more detailed review of the theoretical background, the readers are referred to the individual articles and the cited materials.

2.1 Information Systems Artifact

In 2001, Orlikowski and Iacono pointed out the lack of theorization of IT artifact in the IS field. Their review and eventual categorization showed that IT was conceptualized in five broad meta-categories: the tool view, the proxy view, the ensemble view, the computational view, and the nominal view.

In the *tool* view, technology is viewed as a stable and independent variable that does what its designers intended it to do. In this view, technology is represented as a substitution of labor, as a productivity tool (i.e., labor augmentation), as an information processing tool, or as a social relations tool. In the *proxy* view, technology's value, essential aspects, or properties are represented by few key elements—"proxies"—such as users' perceptual cognitive or attitudinal responses, technology's diffusion rate, and monetary

measures. In the *ensemble* view, the focus is on the interactions between the technology and people during development, implementation, or use in organizations or society at large. In this view, technology is seen as a development project, as a production network, as an embedded system, or as a structure based mainly on the ST of Giddens (1984). In the *computational* view, the focus is particularly on the computational power of technology in representing, manipulating, storing, modeling, processing, etc., aspects of the world. In the *nominal* view, the conceptualization of IT artifacts remains absent; the conceptual and analytical focus is elsewhere. (Orlikowski and Iacono 2001).

In 2015, Lee et al. proposed an alternative concept of the "IS artifact" that encompasses the IT artifact and extends it to cover its context as well. It is a compound of "technology artifact," "information artifact," and "social artifact." They defined *technology artifact* as a human-centered tool that is created to achieve a goal, serve a purpose, or solve a problem that is felt, perceived, and defined by humans; *information artifact* as an instantiation of information, where instantiation happens through human act directly or indirectly; and *social artifact* as an artifact that comprises, or integrates, the interactions or relationships between or among people. However, Iivari (2017) argued that the concept of IS artifact is problematic as a unit of design and offered the concept of *IS application* as the design nexus. He positioned this concept at the intersection of technology, information, and social artifacts and defined it as "a system of application software and digital information content – that provides its users with information about some topics" (p. 770). He also emphasized that the mainstream IS research has mostly disregarded the information artifact.

2.2 Adaptation of Information Systems

IT artifacts are not static or unchanging, but dynamic. Even after a technological artifact appears to be fixed and complete, its stability is conditional because new materials are invented, different features are developed, existing functions fail and are corrected, new standards are set, and users adapt the artifact for new and different uses. (Orlikowski and Iacono 2001, p. 131)

Studying user adaptation is necessary because user strategies for adapting IS mediate the relationship between usage behaviors and their antecedents (Elie-Dit-Cosaque and Straub 2011). However, existing research on IS adoption and use mostly disregards user adaptation and treats user responses to IS as a black box (Elie-Dit-Cosaque and Straub 2011).

In the extant literature, adaptation has been studied with different focuses: the technology itself, the user, and the work system (i.e., organization) (Beaudry and Pinsonneault 2005). These studies have approached adaptation in the context of IS from different theoretical perspectives such as adaptive ST (e.g., Desanctis and Poole 1994; Poole and DeSanctis 1989), structurational model of technology (e.g., Orlikowski 1992), and coping theory (e.g., Beaudry and Pinsonneault 2005;

Elie-Dit-Cosaque and Straub 2011; Whitten et al. 2014). However, none of these studies analyzed IS adaptation from a hedonic/utilitarian perspective.

In the traditional view, the system type is independent of the users and information systems are divided into two: hedonic IS are the systems used in non-organizational contexts and are designed to be used for enjoyment, fantasy, relaxation, etc.; utilitarian IS are systems used in organizational contexts for purposes such as task completion and increased performance. Recently, IS scholars have started recognizing a third system type, dual IS, used for both utilitarian and hedonic purposes (e.g., Gerow et al. 2013; Wu and Lu 2013).

Today, an increasing number of IS are regarded as dual IS, although they were initially designed for either hedonic or utilitarian use only. The systems that were regarded as hedonic-only are now also used for utilitarian purposes; likewise, the systems that were designed to provide utility can now be also used for pleasure. In other words, an increasing number of systems have adapted to provide both pleasure and utility. This adaptation of hedonic- or utilitarian-only systems to dual IS can be theorized by synthesizing the ST (Giddens 1984) and the service dominant logic (SDL) (Vargo and Lusch 2004, 2008). Through ST, IS are treated as social systems that transform over time through their users' actions. ST also helps explain IS adaptation with the lens of a dynamic process, as suggested by Elie-Dit-Cosaque and Straub (2011). Regarding SDL, it provides a motivational perspective of IS users who employ operand and operant resources while using IS. The two theories complement each other: ST provides a processual view of the change in IS use and SDL explains how this change occurs by taking the notion that users operate on resources to get their desired value (Edvardsson et al. 2012).

From this perspective (Köse et al. 2018), IS are seen as social systems that provide interaction settings for people to engage in reproduced relations and regular practices. These relations or practices that may be hedonic or utilitarian in nature shape IS use through different applications of contextual resources. As a result, the IS designed for hedonic- or utilitarian-only use start to serve both ends and turn into dual systems.

2.3 Dual Information Systems

Currently, there is no established definition for a "dual information system." So far, researchers have defined dual IS according to the context of their research; however, this has only caused noise in the field, leading to confusions and misunderstandings regarding what is a dual information system and what is not. Sun and Zhang (2006) defined "mixed systems" as those IS that can be used for both hedonic and utilitarian purposes depending on the task they are used for. According to Chesney (2006), dual IS are those systems that can provide both productivity and pleasure according to the context. Wu and Lu (2013) adopted a slightly different view and defined "dual-purposed IS" as those systems that can be used either to have fun or to perform work/study-related tasks. They also

provided a rule of thumb for classifying the systems. According to this rule, if an information system is used in a work or study environment for 80% of its use time, it is classified as utilitarian; if it is used at home for fun or relaxation for 80% of its use time, it is classified as hedonic; if neither case holds, it is classified as dual-purposed. In contrast to these definitions, Gerow et al. (2013) defined "mixed systems" as those that combine features from both hedonic and utilitarian IS to the extent that they provide fun and utility at the same time.

As can be seen, dual IS are defined from different perspectives. In addition, they are referred to with different names in the literature: dual-purposed IS (e.g., Wu and Lu 2013), mixed IS (e.g., Gerow et al. 2013; Sun and Zhang 2006), multipurpose IS (e.g., Barnes 2011; Chen and Fu 2018; Chun et al. 2012; Hong and Tam 2006; Zhou et al. 2014), convergent IS (e.g., Kim and Sundar 2014), or IS serving both hedonic and utilitarian purposes.

Accordingly, in this thesis, a more comprehensive definition for dual IS is proposed:

> Dual IS are those systems that can be used for hedonic and utilitarian benefits either simultaneously or separately and to different extents according to the context of use.

The term *context of use* encompasses many aspects included in previous definitions of dual IS such as task, use purpose, and use environment. For instance, Belk's (1975) definition of context in terms of five dimensions—physical surroundings, social surroundings, temporal perspective, task definition, and antecedent states—covers these aspects, including use motivation with respect to a system.

Another important highlight is the phrase *simultaneously or separately* in this definition. Previous definitions either omit or have confusing views on this dimension of the dual IS use. However, there is no clear temporal distinction between the hedonic and utilitarian benefits one can receive when using a dual system. Whereas many dual IS can provide hedonic and utilitarian benefits concurrently, many others can provide this separately, depending on the user's conception of the system or the context of use.

Furthermore, classifying systems according to the features they combine can be problematic because, eventually, the end user or the context determines whether the system is used for fun or utility. A good example for this is Workplace. Workplace is an adaptation of Facebook to workplaces, and it supports communication and collaboration among employees (Facebook 2020). Therefore, although it offers features analogous to Facebook, it is used for different purposes than Facebook.

2.4 Post-adoption Intentions and System Use

When users adopt an information system—in other words, they start using the system continually—their various types of intentions and behaviors gain

importance for the success of the subject system. Among these are their continued and discontinued use intentions, contribution intentions, and use intensity.

Continued use intention is the users' mental predisposition that they will continue using the information system for a long period of time after they adopt it. Discontinued use intention, in contrast, is the mental predisposition about ceasing to use an information system. Although these two post-adoption intentions have been assumed to be two ends of the same continuum, increasing research has shown that they have different antecedents (Turel 2015). This is because numerous attitudes toward a psychological object may simultaneously exist in an implicit or explicit manner, or they may emerge contextually (Ajzen 2001). In addition, discontinued use may manifest itself in five different forms according to its temporal stage, meaning, and implications: rejection, regressive discontinuance, quitting, temporary discontinuance, and replacement (Soliman and Rinta-Kahila 2020). *Rejection* is the immediate end of IS use after the initial exposure and before an actual interaction with the system takes place; thus, rejection decision is mainly based on expectations or assumptions. *Regressive discontinuance* is the type of discontinuance that occurs soon after the initial adoption and before the IS use becomes routinized. Therefore, the discontinuance decision occurs after the user's first-hand experience with the system. ECT (Bhattacherjee 2001) is the most well-recognized theory for this type of discontinuance because, according to it, discontinuance occurs when users' expectations are not met during their first-hand experience with the system. *Quitting* occurs after a period of continued use with the intention of giving up the system. This form of discontinuance mainly stems from the changes in the user or the surroundings and is explained by various theories such as diffusion of innovations, uses and gratifications, and technology acceptance. In *temporary discontinuance*, the user temporarily stops their IS use. The intention of returning to using the system may or may not exist at the time of stopping; however, the user starts using the system again at a later point in time. In *replacement*, the existing information system is replaced by an alternative, presumably a more attractive or advanced system. (Soliman and Rinta-Kahila 2020).

Whereas users' continued use intention is essential for the success of the information system (Bhattacherjee 2001), their discontinued use intention is an undesirable behavioral antecedent because it is more profitable to keep existing customers than to gain new ones (Zeithaml et al. 1996). Nevertheless, in contrast to continuance, the discontinuance phenomenon has been mostly disregarded by scholars (Soliman and Rinta-Kahila 2020).

A third post-adoption behavioral intention is the contribution intention, which may take different forms in different types of IS. For example, the contribution of users in the form of shared content is one of the functional blocks of social media services (Kietzmann et al. 2011); and in crowdsourcing services, contribution may be in the form of crowdprocessing, crowdsolving, crowdrating, and crowdcreating (Morschheuser et al. 2017).

System use has been conceptualized in various ways in the literature (Burton-Jones and Straub 2006). The three most common conceptualizations include use duration, use frequency, and use intensity (Venkatesh et al. 2008). These conceptualizations provide a lean measure for system use without capturing much of the user or task context (Burton-Jones and Straub 2006). Use duration represents the accumulation of clock time spent using a system (Venkatesh et al. 2008). Use frequency represents the number of times the system is used. Use intensity represents the user's perception of how much they use the system.

With respect to dual IS, discontinued use intention in particular remains understudied considering the lifecycle of IS use.

3 RESEARCH METHODOLOGY

This section discusses the methodological approaches used in the articles that are included in this thesis. First, the philosophical perspectives are presented. This is followed by the descriptions of the data collection and analysis methods. Finally, the research methodology is evaluated from an ethical perspective.

3.1 Research Approach

The IS field draws from different disciplines and research communities; therefore, it uses a wide variety of research approaches (Mingers 2001; Niehaves and Stahl 2006; Venkatesh et al. 2013). These research approaches are mainly discussed based on distinct paradigms: epistemological and ontological discussions revolve around positivism and interpretivism, the paradigm related to the phases of the problem solving process spans behavioral science and design science research, and a third paradigm distinguishes critical and non-critical research (Niehaves and Stahl 2006). Although critical research has also been identified as a third epistemological approach (e.g., Orlikowski and Baroudi 1991), Niehaves and Stahl (2006) suggested that the critical research paradigm was not exclusive to interpretivism or positivism but rather provided a different perspective to them as in critical-positivism and critical-interpretivism.

All research is based on philosophical assumptions regarding knowledge and how it can be derived—in other words, epistemology (Myers 1997). The underlying epistemological assumptions influence and guide the research methodology, although they may not be fully distinct and may be accommodated in one study. In fact, incorporating more than one research perspective when studying IS phenomena is beneficial because it provides diverse viewpoints (Orlikowski and Baroudi 1991).

Positivistic research has its roots in natural sciences. From an ontological perspective, it assumes that an objective physical and social world independent of humans exists and that this reality can objectively and in a value-neutral

manner be described and measured. It also assumes that humans act rationally (or at least rationally in a bounded manner) and intentionally. With respect to knowledge, the epistemological perspective of positivistic research relies on hypothetic-deductive explanations. Therefore, the goal is to discover unilateral, casual relationships, which can create generalized knowledge across situations. Another consequence of hypothetic-deductive scientific explanations is the tight coupling between explanation, prediction, and control, which means that a given event/action can be explained by certain principles and premises and knowing those principles and premises enables the prediction and control of that event/action. In the IS field, positivistic research is characterized by quantifiable measures of variables, formal propositions, hypotheses testing, and drawing inferences about a phenomenon from the sample to a stated population. (Orlikowski and Baroudi 1991).

In contrast, interpretivist research recognizes the subjective or intersubjective meanings that people associate with a phenomenon. Ontologically, interpretivism social reality is constructed through humans' action and interaction. Therefore, interpretivist research rejects objective truth and seeks to understand the relativistic, albeit shared, account of events and situations. Its objective is not to generalize but to learn and inform from a deeper structural analysis of a phenomenon. Therefore, researchers do not make theoretical deductions regarding the phenomenon. Instead, the explanations are reciprocally interacting or circular models of causality, which intend to elaborate on the actors' social world and their role in it, in contrast to unidirectional positivist casual explanations. (Orlikowski and Baroudi 1991).

In IS research, two viewpoints exist regarding positivism and interpretivism (Niehaves and Stahl 2006). According to the first viewpoint, both positivism and interpretivism accept the existence of an objective real world; however, whereas the former believes that objective knowledge about this world can be achieved, the latter believes that knowledge cannot be independent of the subject (Weber 2004). According to the second viewpoint, positivism and interpretivism are different in both epistemological and ontological assumptions: positivism accepts that objective reality is independent of the observer, and interpretivism rejects this independence (Niehaves and Stahl 2006).

By taking a pluralist epistemological perspective, this research benefits from both positivism and interpretivism. It adopts the first viewpoint as explained by Niehaves and Stahl (2006) and makes use of different research methodologies: mixed methods (i.e., quantitative and qualitative). Accordingly, the used methods focus on different aspects of the topic; therefore, together they provide a richer understanding of the phenomenon by answering exploratory and confirmatory research questions. In exploratory studies, the goal is not to confirm a relationship but to explore its nature in light of the data and the method in a very general form and then allow multivariate techniques to estimate the relationship (Boudreau et al. 2001). In confirmatory studies, however, the aim is to test a proposed relationship. Accordingly, Articles I uses a mixed-methods

approach, Article II uses a qualitative research method, and Articles III and IV use a quantitative research method.

3.2 Data Collection

This thesis uses three different data sets collected during different periods. The first data set was retrieved from Twitter using Twitter application programming interfaces (APIs), whereas the second and third data sets were retrieved through online surveys. The Twitter data are securely stored in assigned servers of the University of Jyväskylä (JYU). The second data set was collected and is protected by the collaborators of the research; therefore, its security and secure processing is not in the responsibility of the doctoral student or JYU. The third data set is securely stored and processed in the assigned network drivers of JYU in line with the data protection guidelines of the university.

3.2.1 Social Media Data Collection

Social media data can be viewed as written, secondary text—that is, they are generated by someone other than the researcher. They can be seen as textual corpora voluntarily created by users of the platform without any request from researchers (Andreotta et al. 2019). Thus, the data emanate from real-world social contexts with a diverse range of individuals whose voice may not be heard through traditional methods such as interviews or surveys with open-ended questions. In that respect, social media data may be more ecologically valid than those obtained via traditional approaches. (Andreotta et al. 2019). In addition, because of the self-generated nature of the data, the researcher has less control and knowledge over the origin of the data; therefore, the data may contain a lot of noise (i.e., irrelevant information) (Mckenna et al. 2017).

The distinctive features of social media data are their high-volume and unstructured and heterogeneous nature (Mckenna et al. 2017). To obtain a manageable amount of data that can be interpreted by the researcher, data collection is based on various criteria: content from top users, content from specific locations, content with specific hashtags, content from certain users, and so on (Andreotta et al. 2019; Marwick 2014). The criteria can be set according to the existing literature, guidelines/regulations regarding the research topic, or the trend surrounding the research topic (e.g., most common hashtags).

These data can be compiled using various tools (e.g., ATLAS.ti and Twitter APIs) in an automated manner. Therefore, the data collection does not require effortful and time-consuming procedures, in comparison to surveys and interviews, once the researcher has access to the data collection and processing tools (Andreotta et al. 2019).

In Article I, social media data were collected to identify and analyze those accounts that posted sponsored advertisements. The data were collected in two phases.

In the first phase, the collected data comprised the timeline and account information of Twitter accounts that were created in the name of top 21 Twitter accounts and the Group of Twenty (G20) leaders (G20 2020). This method was chosen by taking into account the findings of the study related to public identity use on Twitter by Köse et al. (2016). In the second phase, specific hashtags were used for data collection. The hashtags were identified according to Federal Trade Commission regulations and the Word of Mouth Marketing Association guidelines. Thus, tweets made during a 24-h period containing the identified hashtags (#ad, #sp, #advertisement, and #sponsored) were collected.

The data collection was conducted using in-house developed databases and data retrieval interfaces linked to Twitter APIs. The resulting corpus comprised 28,529 Twitter accounts and 36.6M tweets in the first batch and 72K tweets in the second batch.

3.2.2 Systematic Literature Review

Originally developed in the medical field, systematic literature reviews are conducted to answer a clearly defined research question by following a protocol-based approach (Boell and Cecez-Kecmanovic 2015). Okoli and Schabram (2010) defined systematic literature review in their adaption of Fink's (2005) definition as "a systematic, explicit, [comprehensive, (p. 17)] and reproducible method for identifying, evaluating, and synthesizing the existing body of completed and recorded work produced by researchers, scholars, and practitioners" (p. 1).

Systematic literature reviews begin by identifying the purpose of the review and accordingly determining the protocol of the study (Okoli and Schabram 2010). The review protocol should address the research question. In addition, it should determine the sources to be searched, search terms, search strategy, and screening criteria. The screening criteria should involve specific inclusion/exclusion guides that are applied in the literature selection process without leaving much space for individual researchers' judgment, interpretation, or discretion. In this way, subjectivity and bias are eliminated. The database searches are conducted in line with the protocol to find the related publications. The retrieved publications are reviewed according to the inclusion/exclusion criteria, and they are narrowed down to those that are suitable for the review. Next, the selected publications are summarized to report the findings. Finally, the findings of the review are disseminated. (Boell and Cecez-Kecmanovic 2015; Okoli and Schabram 2010).

In Article II, a systematic literature review was used to analyze the progress of the stream of research related to dual IS and develop models for the adoption and post-adoption of these systems. A systematic literature review was chosen as the method for this study because the topic was delimited and the research question was sufficiently specific. In addition, the subject concepts (e.g., adoption and post-adoption) were well-established in IS literature. Therefore, our search terms were very discriminating. The systematic literature review method also made it possible to deal with a potentially large number of sources, compared

with the case if a traditional literature review method was chosen. We conducted the search in Scopus database because it includes a comprehensive list of articles and publication outlets. Focusing on one database also made our method more transparent and replicable.

The screening criteria for the articles were based on content (i.e., topics and variables), research design (i.e., methodology), publication language, and publication outlet. The articles that met the inclusion/exclusion criteria were qualitatively analyzed in a concept-centric manner as suggested by Webster and Watson (2002). Accordingly, the identified concepts were categorized, combined into two research models, and discussed in more detail in terms of their definitions and effects.

3.2.3 Survey

Surveys are used to create statistics regarding the characteristics of a target population (Fowler 2009). Typically, only a fraction of the target population—i.e., a sample—answers the survey questions. Sample surveys combine the methods of sampling, designing questions, and data collection. Good sampling involves providing every (or almost every) member of the population with the same (or a known) opportunity to participate in the survey and using probability methods for sample selection. The data collection can be conducted in person, by telephone, or over the Internet. These different methods have advantages and disadvantages depending on the research topic, characteristics of the sample, and available staff and facilities; and the choice of method affects survey costs, question formats, and response rates.

Articles III and IV made use of survey data collected via the Internet. This data collection mode was chosen because of the research topic: the target respondents were users of online services, so it was necessary for them to have Internet access. The respondents read and answered the survey questions on their own without the presence of an interviewer. In this way, any potential influence that may stem from the interviewer asking the questions was eliminated and the survey cost was minimized. The respondents of surveys in both articles were of international background and were users of the subject dual information system.

The second data set, used in Article III, was collected through an online survey. The target population was the users of the gamified traffic application myDriveAssist. The survey was created using the Unipark program and comprised 81 questions. The link to the survey was shared with the users through an announcement on the application that appeared when users opened the application for use. The survey was active for a period of six months. The incentive for participation was a chance to win one of the five 10 € Amazon gift coupons and three electric screwdrivers.

The third data set, used in Article IV, was also collected through an online survey. The survey was created using the Webropol 3.0 software. The target population was Finland-based foreigners that use Facebook. Therefore, the survey was posted in various Facebook groups created primarily for foreigners.

Invitation to take the survey was also sent through the university's emailing lists that are targeted toward international students. The survey was online for two months between September 2019 and November 2019. During this period, the survey was actively promoted to raise the response rate. The incentive for participation was a chance to win one of the three 50 € gift coupons from Lippu.fi, Ticketmaster, or Amazon services. The survey comprised 64 questions, and the average time to answer them was 15 min. Prior to answering the survey questions, the participants were asked for their informed consent for participating in the research.

3.3 Data Analysis

This thesis comprises both qualitative and quantitative analysis methods. In Article II, qualitative analysis methods were used, whereas in Articles III and IV, quantitative analysis was the adopted method. In Article I, social media data analysis was conducted. This method is a recently emerged methodology and is recognized as a mixed-methods approach (Andreotta et al. 2019). Because of its distinct properties, this methodology will be described in a separate section. This section describes the methods used for analysis; the reader is directed to the articles for more detailed information.

3.3.1 Mixed Method

Social media data analysis is a recently emerged research methodology and is recognized as a mixed-methods approach (Andreotta et al. 2019; Stieglitz et al. 2018). Venkatesh et al. (2013) recognized this convergence in their seminal paper, where they defined mixed-methods research as an approach that sequentially or concurrently combines quantitative and qualitative research methods within a single research inquiry. The exact nature and the steps of applying social media data analysis differ from one research to another and rely on the specific research question being investigated. In general, social media analytics is conceptualized as a four-phased framework (e.g., Andreotta et al. 2019; Stieglitz et al. 2018). The first phase, identification of the corpus retrieval method, constitutes the qualitative part of the method. The collection and compression of social media data into a manageable amount that is interpretable by the researcher, which are the second and third phases, respectively, can be seen as the quantitative side of this mixed-methods approach. The last phase, the analysis of the final data set, can involve both quantitative and qualitative methods. For instance, the content and thematic analysis of the data is a qualitative social media data analysis method, and the application of statistical or social network analysis is a quantitative social media data analysis method. Accordingly, social media data analysis can be seen as a mixed method that sequentially applies qualitative and quantitative methods. These methods are mixed in social media data analysis to achieve compensation and diversity, as conceptualized by Venkatesh et al. (2013).

In other words, by combining these methods, the weaknesses of one approach is compensated by the other, and different views of the same phenomenon are obtained (Venkatesh et al. 2013). Figure 2 displays the four-phased framework for mixed-methods social media data analysis.

The data collection in this mixed-methods approach was described earlier in section 3.2.1. After data collection, various compression techniques can be used to obtain the most relevant data so that the corpus is at a manageable size. These techniques may filter the data according to relevance criteria that can be used to answer the research question or may include random sampling of the most relevant segment of the corpus if the corpus is too large. (Andreotta et al. 2019).

Social media data can be qualitatively analyzed using various content analysis methods (Marwick 2014). For example, Twitter data can be studied through the thematic or discourse analysis of tweets from certain users, close readings of particular accounts, or thematic analysis of tweets containing a particular hashtag.

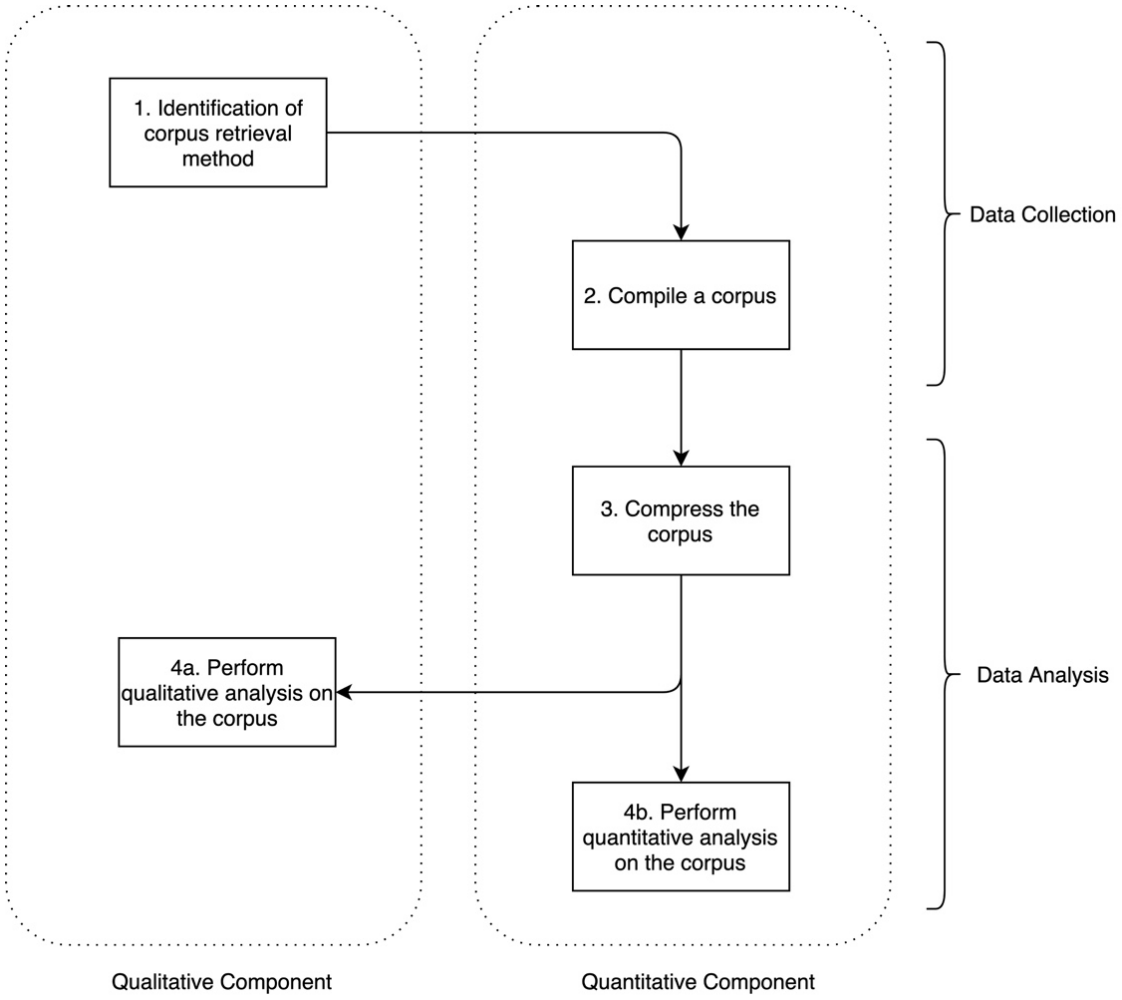

FIGURE 2 Four-phased framework of the mixed-methods social media data analysis

Article I used social media data extracted from Twitter. Because of the sheer amount of the collected data, different filtering techniques were used to decrease this amount to a manageable size and to eliminate data that were not relevant to the research question. Therefore, before analysis, the corpus was compressed through string filtering and random sampling. More specifically, the first data batch was queried for strings that indicated advertisement. In other words, the tweets containing strings or hashtags related to advertisement (e.g., "#advert," "#advertisement," and "sponsored") were retained. Next, the retained data in the "sp" and "ad" files were downsized to their 10% by randomization. Regarding the second data batch, the data were first cleaned from retweets and then a random 10% sample of the cleaned data was retained for analysis.

Following data compression, the remaining data were analyzed using a combination of conventional and directed content analysis approaches. The goal of a conventional content analysis approach is to describe a phenomenon by allowing coding categories to flow from the data in an inductive manner (Hsieh and Shannon 2005). Directed content analysis aims to extend or validate prior research, a theory, or a theoretical framework, which form the baseline for the initial coding scheme (Hsieh and Shannon 2005). First, existing theories helped focus the research question in line with directed content analysis. Then, the data were analyzed using conventional content analysis. Accordingly, the compressed Twitter data (tweets and the associated profiles) were repetitively analyzed to extract the initial coding scheme without imposing preconceived categories or theories. Tweets were coded considering the types of advertisements and web links they contained. Twitter profiles were coded by taking into account their profile information and tweets. Profile information included the profile bio, profile picture, profile name, number of contacts (followers and followings), profile creation date, and last activity date. Tweets were analyzed with regard to the number of tweets, number of retweets, number of received retweets, and posted web addresses, photos, and videos. Later, this initial coding was categorized according to existing research and theories. In this way, the relationship between codes was sorted in a more focused manner.

In addition, number of followers and followings were analyzed in a quantitative manner. More precisely, their descriptive statistics were studied to understand the distribution of the data. This analysis did not require any additional data collection (i.e., from the contacts of the profile) because the number of followers and following are part of the profile information.

Walsham (1995) distinguished the roles of the researcher as outside observer and involved researcher in qualitative research. Outside observers are those that do not interfere with the participants of the study in a way that would affect their responses. In comparison, the role of an involved researcher requires the researcher to be a member of the group and hence get an inside view and access to confidential or sensitive issues. Correspondingly, in the context of social media data analysis, the researcher plays the role of a passive observer in the case of outside observers and of a member of the subject online social network in the case of involved researcher (Mckenna et al. 2017). When conducting research for

Article I, the role of an outside observer, according to Walsham's (1995) view of the roles of researchers, was assumed because the researcher had no involvement with the accounts or the content that was created.

3.3.2 Qualitative Analysis

Qualitative research incorporates the use of qualitative textual data such as interviews, participation observation data, and documents to understand and explain social phenomena (Myers 1997). In the IS field, qualitative research can be used to explore issues related to IS (Lacity and Janson 1994). Text analysis approaches can be categorized as positivist, linguistic, and interpretive according to the assumptions about the text data, such as their nature, the relationship between the researcher and the text, the prescribed method used for understanding the data, and the evidence that is accepted to validate the text interpretation (Lacity and Janson 1994). A qualitative analysis approach was used in Articles I and II.

In Article I, the social media data were analyzed using a positivist text analysis approach. In other words, understanding occurred by identifying non-random variation in the text (Lacity and Janson 1994). The assumption about the nature of the text was that the language and the meaning corresponded to an objective reality. The text was not analyzed to study the subjective views of the subjects (i.e., Twitter accounts) on a certain topic. Instead, it was analyzed to unearth the resources that may have contributed to the utilitarian use of the service. The researcher's role was seen as an outside observer who does not need to interact with the creator of the text to be able to interpret the text's semantics. The text was analyzed using the content analysis method. The coding scheme made use of referential and thematic units. Referential units are multiple word or phrases that refer to the same subject (i.e., phenomenon, person, and object); thematic units represent conceptual units that may require strong interpretation for coding (Lacity and Janson 1994). In the context of this article, the strings and hashtags related to advertisement (e.g., "#advert," "#advertisement," and "sponsored") can be considered as referential units. The following coding schemes applied to tweets and profile descriptions may be viewed as the thematic units. A more detailed description of the content analysis applied in Article I can be found in sections 3.3.1 and 4.1.

Article II was a systematic literature review. After the articles for review were identified, the following information was extracted from them: (a) information system type, (b) theoretical background, (c) methodological details, and (d) research models (independent, dependent variables, moderators, and controls) if the study was quantitative. This information was tabulated and classified for further analysis, and the inclusion and exclusion criteria were applied. The articles that met the criteria were further analyzed at a deeper level. Here, the guidelines provided by Webster and Watson (2002) were followed. The analysis of the research models and the constructs in it involved the content analysis of the authors' definitions of the concepts and their measurements (i.e., operationalizations and the survey questions) of these concepts. Therefore, the

coding scheme made use of thematic units. Because of the nature of the research question, the findings were reported as aggregated research models.

3.3.3 Quantitative Analysis

The quantitative analysis approach was used in Articles III and IV. The collected data in both studies were analyzed through partial least squares structural equation modeling (PLS-SEM). PLS-SEM is a second-generation multivariate data analysis method that enables researchers to integrate the unobservable variables measured indirectly by indicator variables. It is mainly used in exploratory research to develop theories. The analysis was conducted using the SmartPLS 3 software (Articles III and IV). IBM SPSS Statistics (Version 26) was also used for preparing the data, reporting the demographic information, and checking common method bias.

The operationalization of the constructs was mainly based on validated items from previous literature. However, in both Articles III and IV, the operationalization of the main construct of the research question was developed by the researchers. In Article III the items of the construct *user's conception of a system's purpose* and in Article IV the items for the constructs *hedonic* and *utilitarian content* were created by the researchers.

In Article III, the data were analyzed using PLS-SEM. This is because the emphasis was on exploring the effects of the construct *user's conception* due to fact that the theory regarding user's conception was less developed. All the constructs were measured reflectively. Therefore, after the PLS path model estimation, the measurement models were assessed for internal consistency, indicator reliability, convergent validity, and discriminant validity. Internal consistency was assessed through composite reliability (CR) and Cronbach's alpha (Alpha). Indicator reliability was assessed by checking the outer loadings of the indicators, which should be higher than 0.708. Convergent validity was assessed through average variance extracted (AVE), which should be higher than 0.5 for each construct. Discriminant validity was assessed by comparing the indicators' outer loadings on their own and other constructs. Fornell-Larcker criterion was also used to assess the discriminant validity. As a result of these evaluations, one item from the construct *user's conception* was removed. After this removal, all criteria regarding the measurement models were met. The structural model was assessed by analyzing the path coefficients and the coefficient of determination (R^2 value). These analyses showed that four of the hypotheses related to *user's conception* were supported: one of them at a significance level of 1%, two of them at a significance level of 5%, and one of them at a significance level of 10%. R^2 values are assessed differently according to the discipline and research model (Hair Jr et al. 2016). For instance, the rule of thumb in marketing research is that R^2 values of 0.75, 0.50, or 0.25 are assessed as substantial, moderate, and weak, respectively (Hair et al. 2011). However, Chin (1998) considered R^2 values higher than 0.67, 0.33, and 0.19 to be substantial, moderate, and weak, respectively. Based on these cut-off values, the R^2 values obtained in this study can be assessed to range between weak and moderate.

In Article IV, the data were analyzed using PLS-SEM. The main reasons for this choice were the small sample size and the existence of a formative measure. Similar to Article III, here, the reflective constructs were assessed for internal consistency, indicator reliability, and convergent and discriminant validity by checking the outer loadings of the indicators, CR, Alpha, AVE, and Fornell-Larcker criterion. In this study, the use intensity construct was formatively measured. Therefore, it was separately assessed by checking its collinearity among its indicators and the significance and relevance of the outer weights. The collinearity was checked through the variance inflation factor (VIF). As a result of these evaluations, three indicators from the reflectively measured constructs *hedonic* and *utilitarian content* and one indicator from the formatively measured construct *use intensity* were removed from the measurement models. After these removals, the criteria regarding the measurement models were met. The structural model was assessed by analyzing the path coefficients and the coefficient of determination (R^2 value). According to this analysis, four of the eight hypotheses were supported at a significance level of 1%, and one hypothesis was supported at a significance level of 10%. The model's predictive power for the dependent variables varied. Considering various rules of thumb regarding R^2 values, the values obtained in this study can be assessed as weak.

3.4 Ethical Evaluation of the Research Methodology

Ethics is a branch of philosophy that looks into human conducts from the perspective of being right and wrong and the idea of mores, that is, acceptable or unacceptable behavior (Remenyi et al. 2011). Although a human concern from the ancient times, ethics is dependent on the time and location; therefore, it is a relative and situational concern (Remenyi et al. 2011).

As any other human conduct, research is also subject to ethical concerns. Research is a systematic study in the form of observations, experimentations, and thinking, the result of which adds to the current body of knowledge (ALLEA - All European Academies 2017; Remenyi et al. 2011). Ethics in research is based on the fundamental principles of reliability, honesty, respect, and accountability, and it is relevant in its different contexts: research environment; training, supervision, and mentoring; research procedures; safeguards; data practices and management; collaborative working; publication and dissemination; and reviewing, evaluating, and editing (ALLEA - All European Academies 2017). In general, ethical concerns in academic research revolve around the following:

- The nature of the research question
- The methods used for answering the research question
- The safety and wellbeing of the researcher, the research subjects, and the other participants of the research
- The transparency of research with all those involved in it
- Plagiarism

- The application of the results

Since the General Data Protection Regulation (EU) 2016/679 (GDPR) was issued, the ethical use of data, especially personal data, has become ever more important. The GDPR prohibits the use of personal data except under certain conditions as stated in Article 9 of GDPR (EU Legislation 2016). For instance, to process personal data, an explicit consent from the data subject is required, unless the personal data are manifestly made public by the data subject (EU Legislation 2016).

Conducting research in an ethical manner is essential for the reputation of both the researcher and their associated institution or university. For this reason, universities have research ethics committees to ensure that the research conducted at the university complies with ethical standards. Depending on the resources, the research ethics committee may operate at the university, faculty, department, or supervisor level (Remenyi et al. 2011). At JYU, the research ethics committee is at the university level.

The following subsections describe the ethical procedures followed in Articles I and IV, where the data were collected and managed within JYU.

3.4.1 Ethical Management of Social Media Data

The use of traditional ethical frameworks in answering ethical concerns regarding the use of social media data is limited (Townsend and Wallace 2016). Because social media data are publicly available, many may interpret that they can freely use these data for research purposes. However, ethical concerns are not that straightforward. Ethical use of social media data is still in dispute and has many gray areas; therefore, their ethical use is mainly dependent on the subjective judgements of the individual researchers who lack guidance from formalized guidelines created by academic institutions and research ethics committees (Samuel et al. 2019).

With regard to social media data, ethical concerns exist around the distinctions between private vs. public, informed consent, participant anonymity, and risk of harm (Ackland 2013; Hennell et al. 2019; Samuel et al. 2019; Townsend and Wallace 2016). Figure 3 displays these concerns.

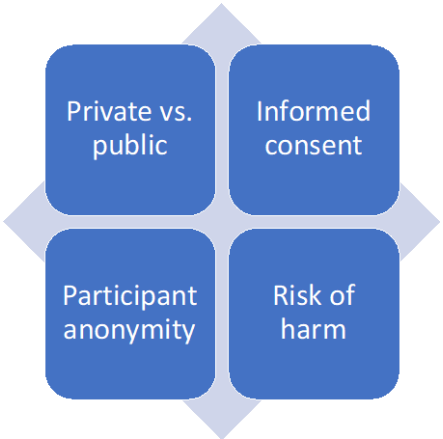

FIGURE 3 Ethical concerns related to social media data use for research purposes

Whether social media data are considered *public or private* is also dependent on the online setting and the social media user's expectations. For example, a permission-required Facebook group is considered private, whereas an open discussion on Twitter with the use of hashtags is considered public. The public availability or privacy of the data also highlights the necessity of informed consent from the social media users. (Townsend and Wallace 2016).

Informed consent is a process where the researcher informs the participants about the nature of the study, its possible risks, and their right to withdraw and ensures that this information is understood by the participants (Ackland 2013). In many social media studies, participants are rarely aware of their participation in a study and their consent is not sought, particularly in cases where data are gathered in an aggregate manner from thousands of entries (Townsend and Wallace 2016). Overall, the necessity of informed consent depends on the nature of the community (public vs. private) and participant anonymity (Ackland 2013).

Anonymity in the case of social media data becomes an issue when data sets or individual sets of data are published online, in conference proceedings, or in journals. Particular attention must be paid when the data set is related to sensitive topics and when its publication may pose risks to the social media users. (Townsend and Wallace 2016).

In social media research, *risk of harm* may mainly be in the form of psychological or social harm such as possible embarrassment, reputational damage, and online/offline harassment or prosecution that the social media user may face when their privacy and anonymity are breached (Hennell et al. 2019). This can occur in cases where quotes from social media platforms are published verbatim. Of particular concern is related to sensitive topics, vulnerable groups or underage people. However, risk of harm may not be present when quotes are shared from public figures, bodies, and organizations and when the social media user is clearly aiming for broader readership, for instance, by using hashtags in public discussions on Twitter. (Townsend and Wallace 2016).

These ethical concerns may be tackled by paying attention to several points in the context of research procedures, safeguards, and data practices and management, as conceptualized by The European Code of Conduct for Research Integrity (ALLEA - All European Academies 2017).

In the context of research procedures, concerns regarding the access and use of the data, informed consent, and participant anonymity are specific to the social media context. According to the framework developed by Townsend and Wallace (2016), researchers should be attentive to the questions:

- Is the collection of data and their use for research accepted/allowed by the terms and conditions of the specific platform and the relevant disciplinary, funding, legal, or institutional guidelines?
- Will the social media user be anonymized in published outputs?
- Is informed consent necessary?

Regarding safeguards, risk of harm to the participants and the researcher is specific to the social media context. According to the framework developed by Townsend and Wallace (2016), researchers should be attentive to the questions:

- Can the social media user reasonably expect to be observed by strangers?
- Are the research participants vulnerable? (i.e., children or vulnerable adults)
- Is the subject matter sensitive?

Regarding data practices and management, sharing data sets is specific to the social media context. According to the framework developed by Townsend and Wallace (2016), researchers should be attentive to the question: "Can you publish or share the dataset?" In particular, personal identifiers from the data should be removed prior to sharing. These points may guide the researchers during their social media research and are summarized in Figure 4.

Nevertheless, it is important to take a reflexive approach to social media research and its context to support and enable its ethical conduct (Hennell et al. 2019). Samuel et al. (2019) suggested that discipline- or analysis-specific ethical guidelines to social media research would be useful. In that respect, Sclater's (2016) model for the development of a code of practice can be followed for creating the discipline- or analysis-specific guidelines for the ethical use of social media data.

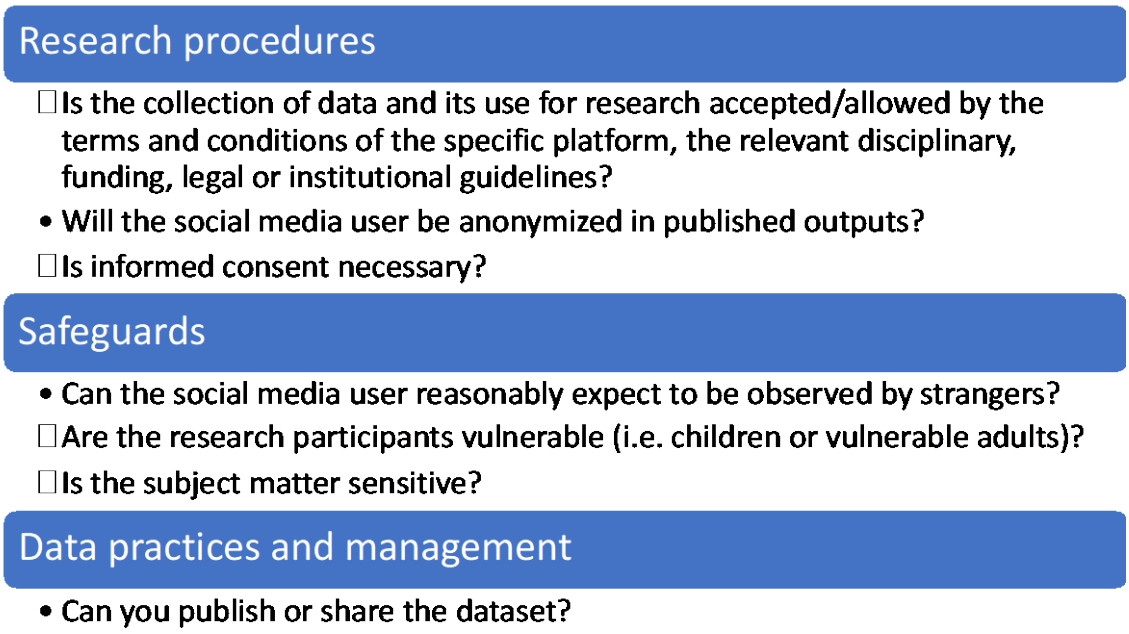

FIGURE 4 Guidelines for ethical conduct of social media research

Article I made use of social media data collected from the Twitter service. Twitter's terms of service allow the use and re-publication of the content on its platform for research purposes, and its users agree that the content they share can be shared and published in any and all media and distribution methods (Twitter Inc. 2020a). In this study, the data were collected only from public accounts. Therefore, only the *publicly* available data were collected. The data collected in the first data set belonged to accounts created in the name of public figures. In the second data set, data were collected from the accounts clearly aimed to reach a broader audience by the use of hashtags. This can also be

induced by considering the innate nature of advertisements. Thus, the data collected in this study can be considered public data. Therefore, it can be concluded that no informed consent was necessary for the data collection. The subject matter of the study is not a sensitive topic. Therefore, its publication does not pose risk or harm to its participants. Thus, it can be concluded that the researcher can directly quote the tweets without having to obtain informed consent.

The collected data were analyzed using statistical and content analysis methods, and the results were mainly reported in an aggregated manner. In addition, direct quotes from the profile bios were provided in the article without any references to the user identifier or username. The direct quotes were chosen from impersonal profiles and social media influencers who clearly aimed at reaching a broader audience; therefore, the publication of their quotes might even be desired by the profile owners.

The data set is currently archived in the university servers that are protected through directory and file-level access permissions. The data set will not be published online and will be deleted within two years.

Given the available best practices on social media research and general ethical research guidelines, this research can be seen as free from ethical concerns.

3.4.2 Ethical Management of the Survey Data

Ethical frameworks regarding quantitative research methods through the use of online surveys are quite established. Accordingly, the ethical guidelines of JYU were followed when conducting the survey for Article IV and managing the collected data.

At the survey design stage, the personal data to be collected from the respondents were kept to a minimum. Once the survey was fully designed, approval from the ethics committee of the university was requested. The research included the principle of informed consent and did not pose any form of harm and discomfort to the participants; therefore, approval from the ethics committee was received without any remarks.

The consent for participation and use of data was sought through the informed consent and privacy notice documents. These documents were prepared using the templates provided by JYU. The informed consent document contained information regarding the data controller, the research, voluntariness for participation, progress of the study, non-existence of harm or discomfort resulting from the study, research costs, research results and their announcement, and contact details for obtaining additional information about the research. The privacy notice document contained information regarding personal data collected in the survey, their protection, their possible transfer outside the European Union or the European Economic Area, the data controller and researchers, and the rights of the data subjects.

The collected data were stored in the assigned drivers of JYU and were only accessed and analyzed by the data controller—the doctoral student. The data will be deleted once the research is complete.

4 SUMMARY OF THE ARTICLES

4.1 Article I

Köse, D. B., Semenov, A., and Tuunanen, T. 2018. "Utilitarian Use of Social Media Services: A Study on Twitter," *Proceedings of the 51st Hawaii International Conference on System Sciences*, pp. 1046–1055.

This article answers RQ 1: "What resources contribute to the utilitarian use of IS, particularly social media services?"

The article focuses on studying the resources that are employed to gain utilitarian benefits in the use of the social networking service, Twitter. The study was conducted using a positivist approach, and it benefited from both qualitative and quantitative methods. The study is based on social media data, in particular, data collected from Twitter. These data comprised Twitter profiles and their tweets and the tweets that contained hashtags related to sponsored advertisements.

The data collection was realized through the use of in-house developed databases and interfaces linked to Twitter APIs (Twitter Inc. 2020b). The data were collected between February and April, 2017. The data comprised two batches. The first batch included data of profiles created in the name of G20 leaders and the 21 most popular Twitter accounts (accounts that have the highest number of followers) as well as their tweets. That is, we collected the profile information of the accounts created in the name of these 42 public personas and their 3,200 most recent public tweets. This first batch of data consisted of 28,529 Twitter accounts and 36.6M tweets. The second batch of data comprised tweets that had hashtags related to sponsored content (e.g., #ad, #sponsored, #sp, and #advertisement). The collection of these tweets was done in 24 h and resulted in 72K tweets.

Next, the data were downsized using cleaning, string filtering, and randomization methods. In this way, the volume of the data was decreased such that it was practically manageable for manual analysis. The details of this data compression phase are described in section 3.3.1 and in the respective part of the original article. Figure 5 summarizes the data collection of this study.

The compressed data were analyzed using content analysis: first to distinguish the advertisements from non-advertisements and later to classify and code the resources used by the advertisement posting accounts. The Twitter profiles were analyzed by taking into account their profile picture, profile name, number of contacts (followers and followings), profile creation and last activity dates, number of tweets, number of retweets, number of received retweets, and posted URLs, photos, and videos. Number of contacts were quantitatively analyzed (i.e., their descriptive statistics were extracted).

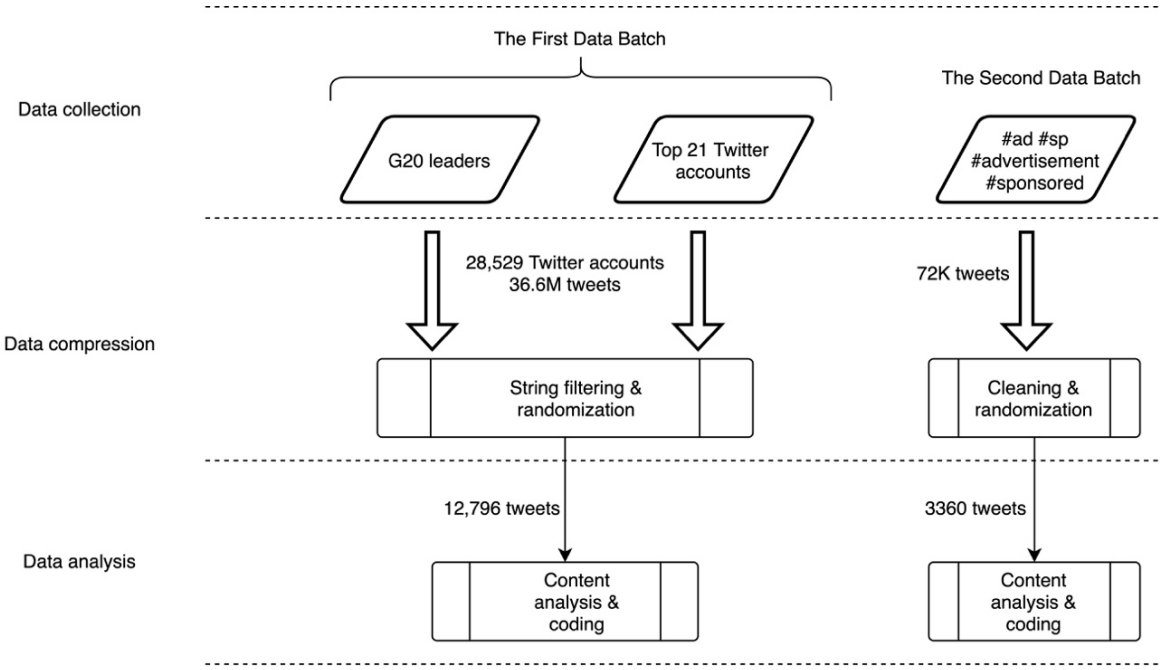

FIGURE 5 The method of Article I

The results of content analysis showed that the Twitter accounts that published advertisements made use of a combination of resources that are internal and external to the Twitter service itself. The internal resources refer to the attributes of the service, such as its functionalities, technical specifications, or accessibility. The external resources may be viewed from the perspective of network externalities (NE). For example, high number of followers was an example of direct NE that increased the social capital of the Twitter accounts. In terms of indirect NE, other social media services (e.g., YouTube, Instagram, and paper.li), e-commerce websites (e.g., Amazon and eBay), and services that combined their value offering with the Twitter service (e.g., SponsoredTweets) were used to gain monetary benefits through Twitter.

Online identity was another type of resource that the advertising accounts benefited from. Online identity was used in two ways. In the first case, the account owners made use of their skills and knowledge when constructing their online identity. In the second case, the online identity was based on public personas (e.g., celebrities and politicians), entities (e.g., sports clubs), or hobbies (e.g., gaming) to provide fandom base or news about these subjects. Figure 6 summarizes the external resources employed by Twitter accounts that publish sponsored content. Table 2 shows the different combinations of these resources used by the accounts that published sponsored content.

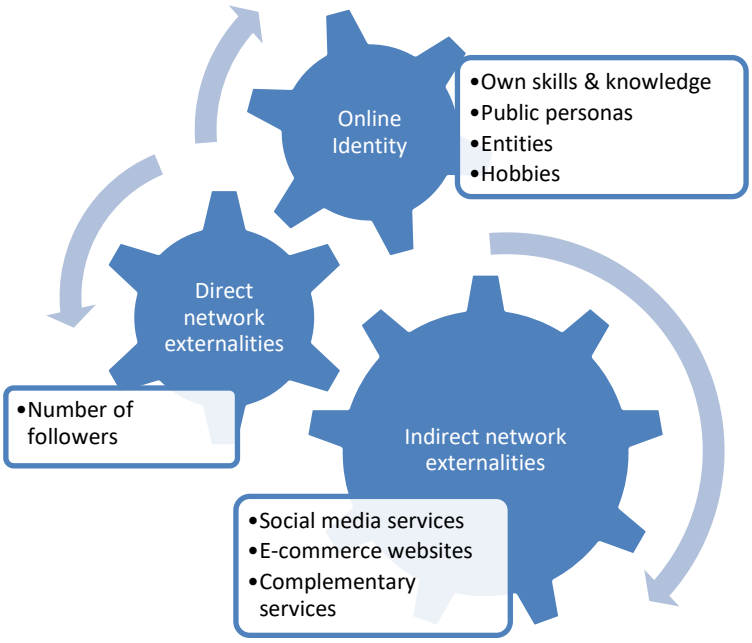

FIGURE 6 External resources used by sponsored-content–publishing Twitter accounts

TABLE 2 Examples of resource use of Twitter accounts that publish sponsored content

Resources	Example
Online Identity + Direct NE	News feed about celebrities
Online Identity + Direct NE	Presentation of skills and knowledge
Indirect NE	Advertisements via SponsoredTweets
Online Identity + Direct NE + Indirect NE	Advertisements of merchandise about celebrities via eBay Partners

One of the key outcomes of this study is the theorization of adaptation in the context of social media services. As Twitter founder Evan Williams acknowledges, Twitter has shifted in time from its initial design as a social utility for status updates to an information network in parallel with alterations and addendums to its feature set (Lapowsky 2013). Since its launch, Twitter has been employed in miscellaneous cases; it has become an alternative news media and a tool for communication in crises and is used in election campaigns and for advertisement purposes (Twitter Inc. 2016). In accordance with these employments, it has undergone a series of reformations to enhance user experience and align its value offerings with users' value determinations. It has improved its value propositions through acquisitions and partnerships.

Interestingly, Twitter's prominent features are user innovations that were born out of necessity. Mentions, hashtags, and retweets were all created after users of the service started to use the symbols @, #, and RT before usernames, words, and messages to enhance communication between each other (MacArthur 2016; Seward 2013). Hashtags have become one of the most pervasive features spreading over to other platforms (e.g., Facebook and Instagram) and are used for information search and spreading as well as audience targeting. Ensuing was the development of advertisement tools that started since 2010, with promoted tweets, trends, and accounts; this was followed by real-time conversation monitoring, self-service advertising, promoted videos, and the Twitter brand hub used for analyzing brand conversations.

However, developments were not limited to these: the company worked on increasing the media richness of the service by introducing video sharing, mobile video sharing, and live video sharing. It enhanced communication possibilities by allowing group and open direct messages and introducing moments. Furthermore, it increased the diversity of the activities on the platform by adding features such as Twitter TV Rating, real-time bidding, and polls. The integration of different platforms and interfaces was also a constant agenda, along with growing its service ecosystem by offering its open source libraries and developer tools to the public. (Twitter Inc. 2016).

Therefore, although initially designed for hedonic purposes, Twitter has turned into a multipurpose information system owing to users' adaptions and developers' addendums to the service. Figure 7 displays the theoretical model for this adaptation process.

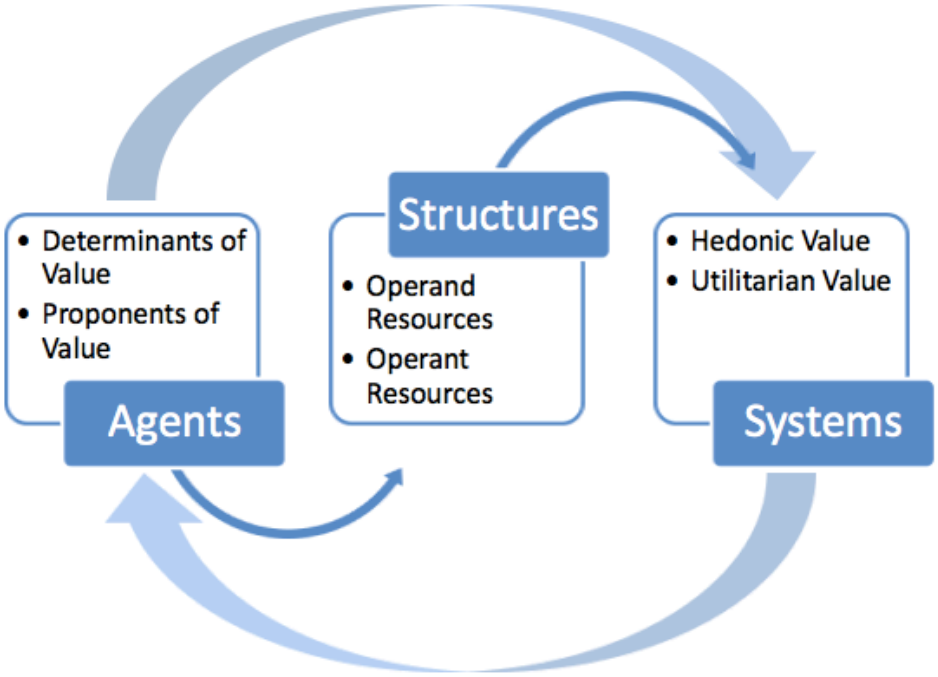

FIGURE 7 Adaptation of social media services

This model is a synthesis of ST by Giddens (1984) and SDL by Vargo and Lusch (2004, 2008). Through ST, IS are treated as social systems that transform over time through their users' actions. SDL provides a motivational perspective of IS users who employ operand and operant resources while using IS. The two theories complement each other: ST provides a processual view of the change in IS use and SDL explains how this change occurs by taking the notion that users operate on resources to get their desired value (Edvardsson et al. 2012).

Although this study focused only on social media services, the synthesized model can be applied to other types of dual IS. For example, games and gamified systems are well-suited to this model: different features of games or gamified systems may be used to gain hedonic and utilitarian benefits. Huotari and Hamari's (2017) view of games and gamification is also in line with this perspective.

One critique toward this study might be that the data does not reflect a processual change; rather, it can be regarded as "cross-sectional." This limitation of the study points to future studies. To fully reflect the theory, a longitudinal study that reviews both the service designers' and the service users' experiences with the technology is needed. However, this kind of study may not be suitable for doctoral studies because of time limitations.

This study was conducted in a collaborative manner. The contributions of the authors are presented in Table 3, in line with the guidelines provided by the Finnish National Board on Research Integrity TENK (Finnish National Board on Research Integrity TENK 2019) and Contributor Roles Taxonomy (CRediT) (CASRAI n.d.).

TABLE 3 Contributions of the authors according to CRediT (Article I)

Author	Role	Definition
Köse	Conceptualization	Ideas; formulation or evolution of overarching research goals and aims.
Semenov	Data curation	Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later re-use.
Köse & Semenov	Formal analysis	Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data.
Köse & Semenov	Investigation	Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.
Köse	Methodology	Development or design of methodology; creation of models.
Köse	Project administration	Management and coordination responsibility for the research activity planning and execution.
Semenov	Resources	Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools.
Köse & Tuunanen	Supervision	Oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team.
Köse & Semenov	Validation	Verification, whether as a part of the activity or separate, of the overall replication/reproducibility of results/experiments and other research outputs.
Köse	Visualization	Preparation, creation and/or presentation of the published work, specifically visualization/data presentation.
Köse	Writing – original draft	Preparation, creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation).
Köse	Writing – review & editing	Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision – including pre- or post-publication stages.

4.2 Article II

Köse, D. B., and Hamari, J. 2019. "Dual Information Systems: A Review Of Factors Affecting Their Use," In *Twenty-fifth Americas Conference on Information Systems* (pp. 1–10). Cancún.

This article answers RQ 2: "What factors affect the adoption and post-adoption of dual IS?"

The article provides an overview of the extant literature that studied the factors affecting the adoption and post-adoption of dual IS. This is achieved through a systematic literature review following the guidelines provided by Boell and Cecez-Kecmanovic (2015) and Webster and Watson (2002). The literature search was conducted in the Scopus database that provides a comprehensive and multidisciplinary list of publication outlets. The search string returned 94 articles in the database. After the application of the inclusion/exclusion criteria, 35 articles remained for review. Figure 8 provides

the summary of the study selection. The selected articles were studied in a concept-centric manner (Webster and Watson 2002). The factors studied in them were analyzed, compared, and contrasted to each other. In particular, the conceptualization and operationalization of the constructs were examined.

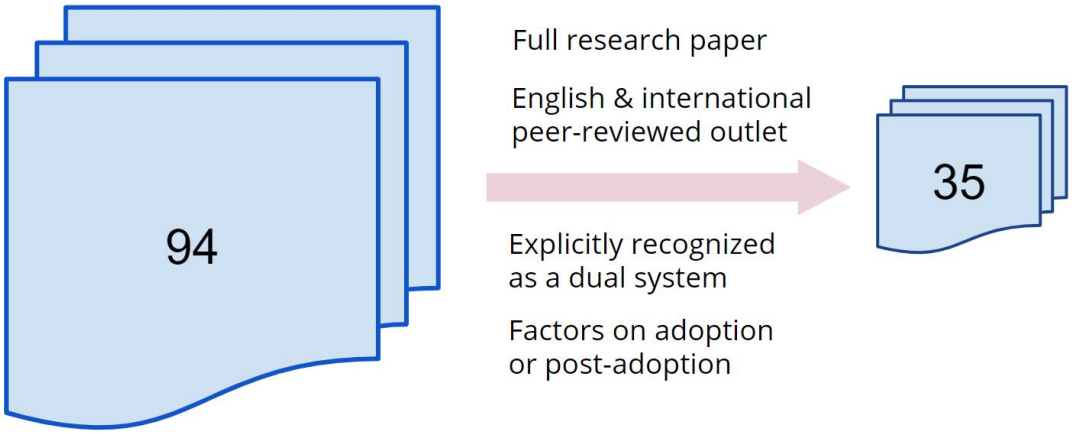

FIGURE 8 Flow diagram of the study selection

The main results of the review were the two models regarding the factors influential in the adoption and post-adoption of dual IS. The first model presented the factors studied in the extant literature regarding the acceptance of dual IS. The second model presented the factors studied in the extant literature regarding the post-adoption of dual IS. The second model only reflected continued use in terms of post-adoption because the review did not bring up any studies on the discontinued use construct. The models were constructed on the basis of TAM and ECT because these two theoretical standpoints were the most common ones in the reviewed literature. The factors were studied and grouped with respect to the IS artifact and its dimensions conceptualized by Iivari (2017). In addition, their effects on the two theories' main constructs were indicated in the models. Figures 9 and 10 display the resulting models.

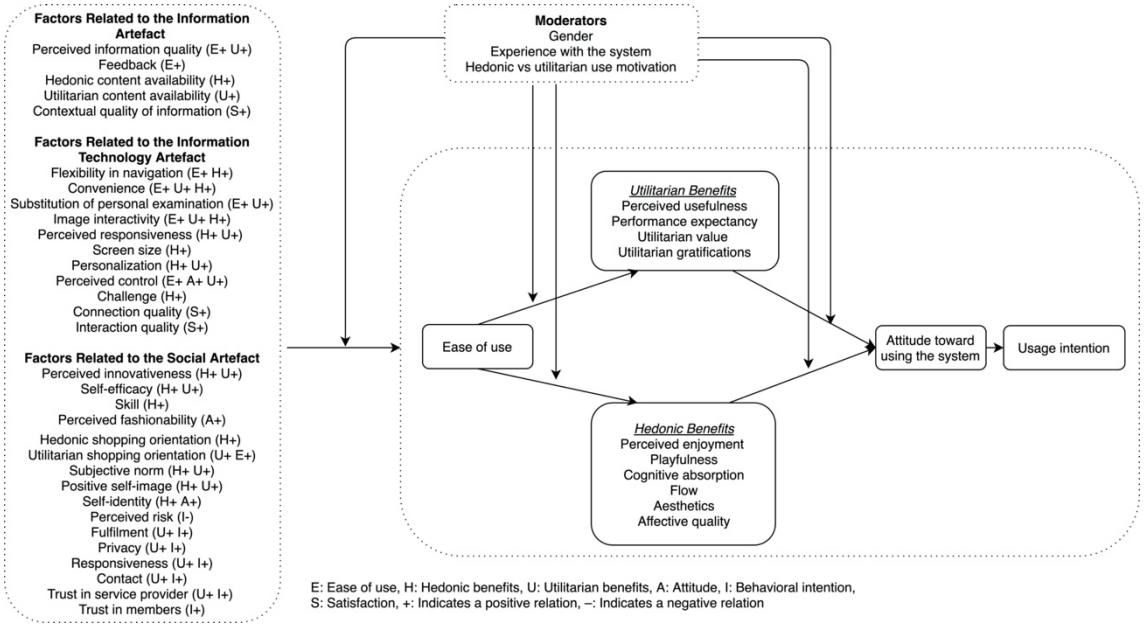

FIGURE 9 TAM-based model of factors affecting the acceptance of dual IS

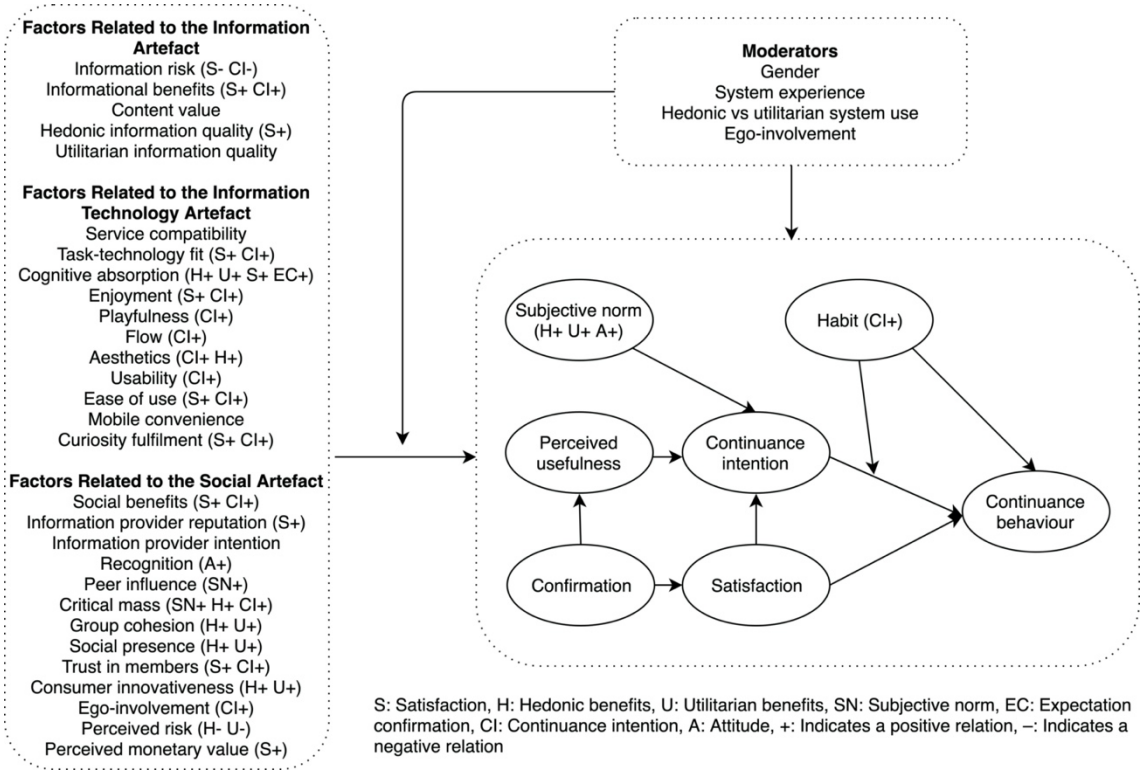

FIGURE 10 ECT-based model of factors affecting the continued use of dual IS

Although not discussed explicitly in the article itself, the two models can be compared to identify future research areas. The two research areas, dual IS adoption and post-adoption, may feed each other in terms of possible research gaps that are important for these two phases of the IS lifecycle. Moreover, as mentioned before, the review found only studies related to the continued use of dual IS. Therefore, future research may investigate how the factors found regarding continued use may affect, for instance, discontinued use intentions. Furthermore, the factors studied in one type of dual information system may also be influential in other types of dual IS; such factors may be studied in different types of dual IS.

In terms of the information artifact, the factors studied in the extant literature were relatively few. Figure 11 displays these factors; on the left are the factors related to the adoption and on the right are the factors related to the post-adoption of dual IS. Comparing the factors between the acceptance and continued use models, few future research areas can be identified. For instance, the construct feedback can be studied in the context of post-adoption in dual IS. Another avenue for future study might be the contextual quality of information in the context of post-adoption.

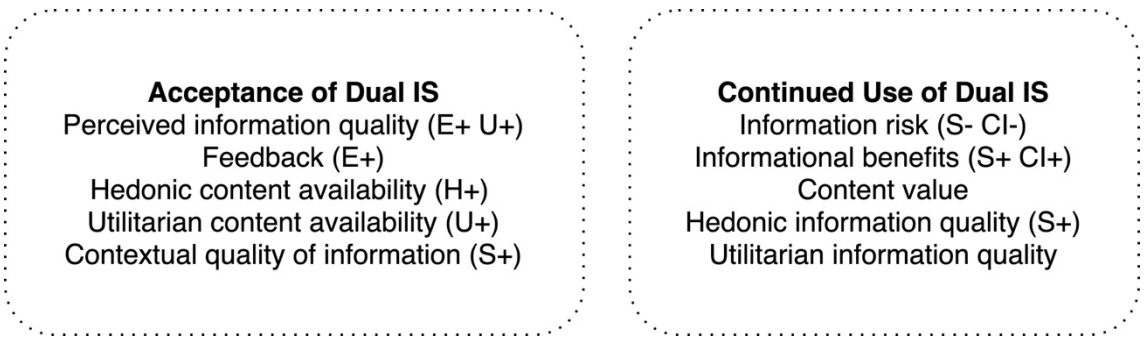

FIGURE 11 Factors related to the information artifact

In terms of the IT artifact, the factors studied regarding the adoption of dual IS are more elaborate than those studied related to the post-adoption stage. Figure 12 displays these factors; on the left are the factors related to the adoption and on the right are the factors related to the post-adoption of dual IS. Future research may look into the effects of perceived responsiveness, personalization, connection quality, and interaction quality with respect to the post-adoption of dual IS.

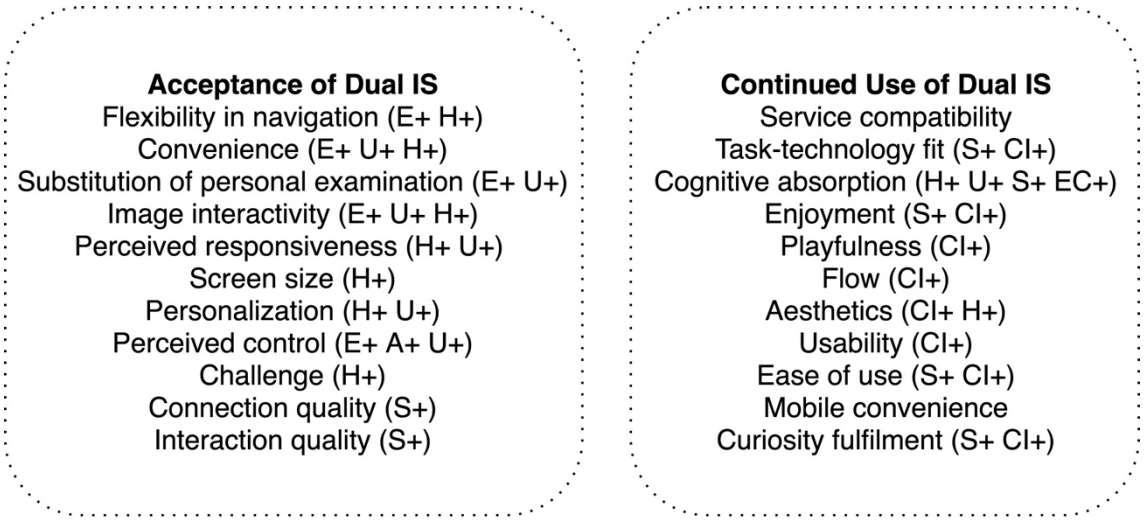

FIGURE 12 Factors related to the information technology artifact

In the social artifact dimension, the studied factors related to the post-adoption of dual IS were relatively richer than those in the other dimensions of the IS artifact. Figure 13 displays these factors; on the left are the factors related to the adoption and on the right are the factors related to the post-adoption of dual IS. Future research may focus on the factors related to adoption that do not match the factors in the post-adoption stage of dual IS. Examples are perceived fashionability, subjective norm, privacy, responsiveness, and trust in the service provider.

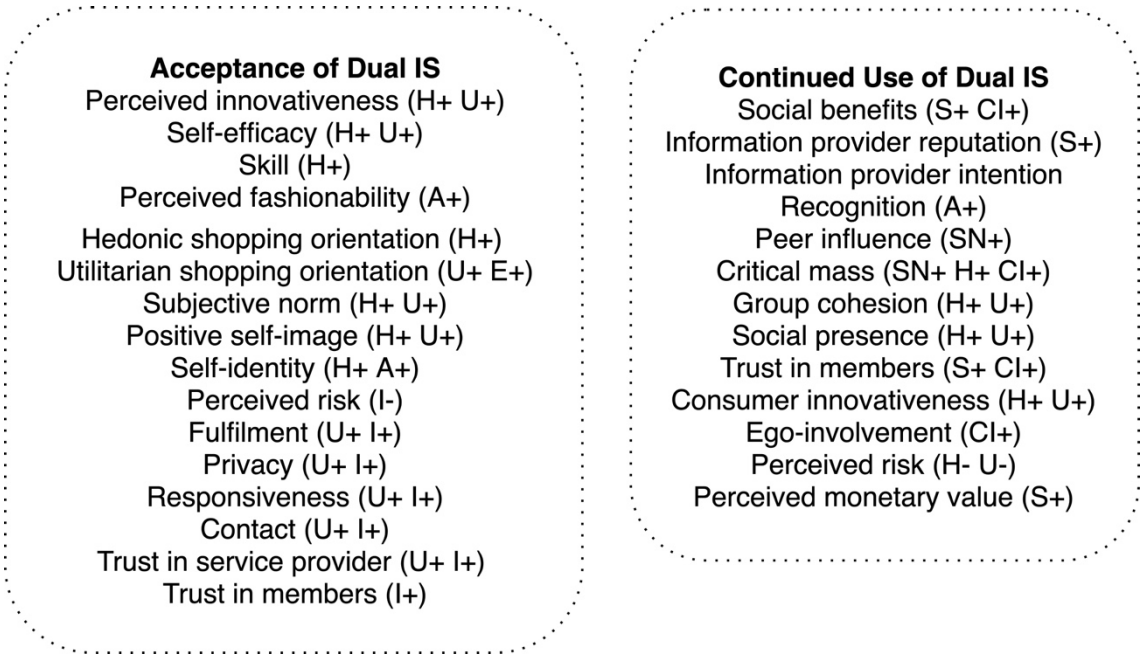

FIGURE 13 Factors related to the social artifact

The study had several other findings in addition to the initial research question. Although not explicitly stated in Article II itself, one finding of the review was that dual IS are named differently in different studies, including dual, mixed, multi-purpose, convergent, and serving both hedonic and utilitarian purposes. This finding may indicate that the concept of dual IS is not very well-established in IS literature. Another finding was that the review showed 15 types of systems that were positioned as dual IS. Figure 14 shows these systems and their total number in the 35 articles reviewed in this study. This result extends the type of technologies that were regarded as dual IS in previous studies (e.g., Gerow et al. 2013; Wu and Lu 2013). More specifically, social networking services, online shopping services, virtual worlds, online multi-player games, mobile museum guides, and gamified services were also regarded as dual IS.

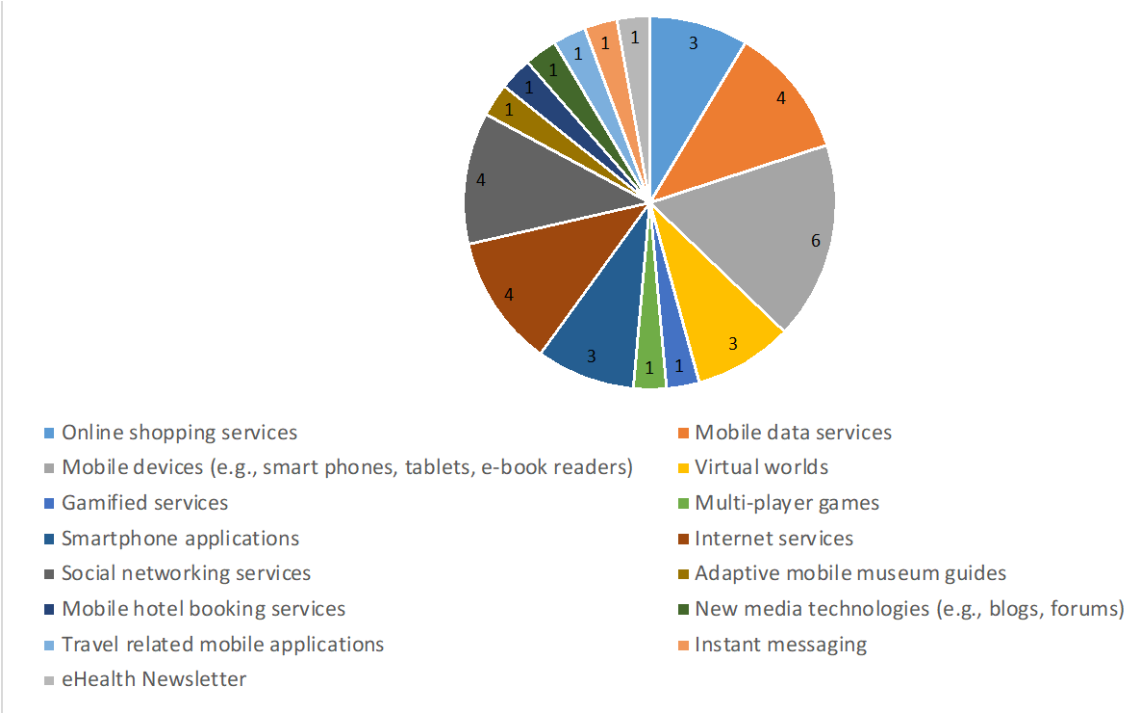

FIGURE 14 Systems that were classified as dual IS in the review

This article contributes to the stream of research that looks into IS types, their different uses, and the factors affecting their use. In particular, it provides an in-depth review of studies related to dual IS. The results of this study are useful for system designers and managers in several ways. First, the designers and managers may develop a perspective that their system might serve multiple purposes—that is, it might be a dual system. Accordingly, they may identify ways to improve their service offering from both hedonic and utilitarian aspects. Second, the two models proposed in this article provide practitioners a comprehensive list of factors that may affect the use and hence the success of their system. Assessing these factors at the design, development, and marketing stages of the system would prove useful for the longevity of the subject technology.

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Köse	Formal analysis	Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data.
Köse	Investigation	Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.
Köse & Hamari	Methodology	Development or design of methodology; creation of models.
Köse	Project administration	Management and coordination responsibility for the research activity planning and execution.
Köse	Resources	Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools.
Köse & Hamari	Supervision	Oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team.
Köse	Validation	Verification, whether as a part of the activity or separate, of the overall replication/reproducibility of results/experiments and other research outputs.
Köse	Visualization	Preparation, creation and/or presentation of the published work, specifically visualization/data presentation.
Köse	Writing – original draft	Preparation, creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation).
Köse	Writing – review & editing	Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision – including pre- or post-publication stages.

4.3 Article III

Köse, D. B., Morschheuser, B., and Hamari, J. 2019. "Is It a Tool or a Toy? How User's Conception of a System's Purpose Affects Their Experience and Use," *International Journal of Information Management* (49), pp. 461–474.

This article answers RQ 3: "How does a user's conception of the purpose of a dual system affect their use intentions?"

The article focuses on studying the effects of a *user's conception of a system's purpose*. In particular, it tests whether this construct interacts with the effects of perceived enjoyment, usefulness, and ease of use on continued use, discontinued

use, and contribution intentions. The study was conducted following a hypothetic-deductive method: a theoretical model focusing on the effects of the user's conception construct was proposed and then the hypothesized effects were empirically tested. This test was performed through a research model that was a revision of van der Heijden's (2004) TAM. Figure 15 presents the research model of the study.

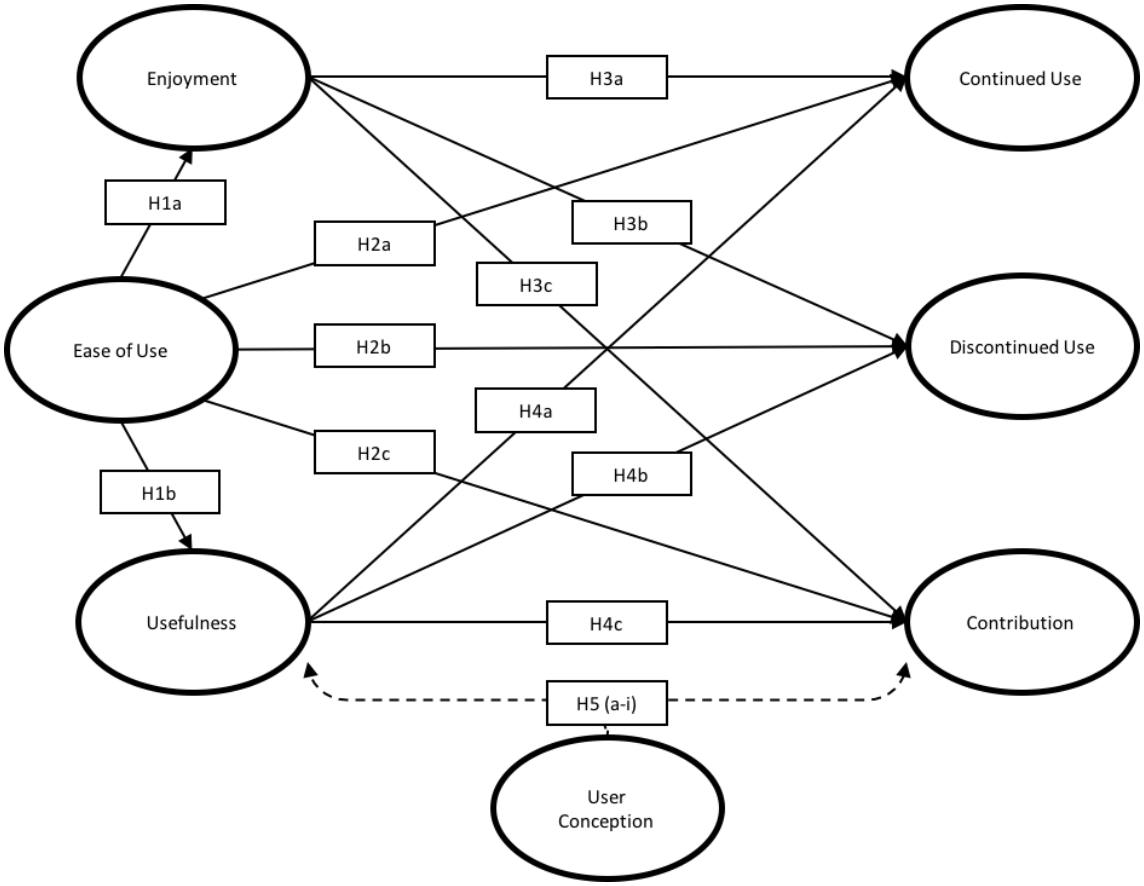

FIGURE 15 Research model for estimating the moderating effects of user's utility–fun conception of a system

This study was based on data from an online survey sample of 562 users of a gamified system. The theoretical model and the effects of the *user's conception* construct were tested using PLS-SEM. The validity and reliability of the constructs and the items were found satisfactory after dropping an item from the user's conception construct. The results of the path analysis supported 12 of the 20 tested hypotheses. Figure 16 presents the results of the analysis.

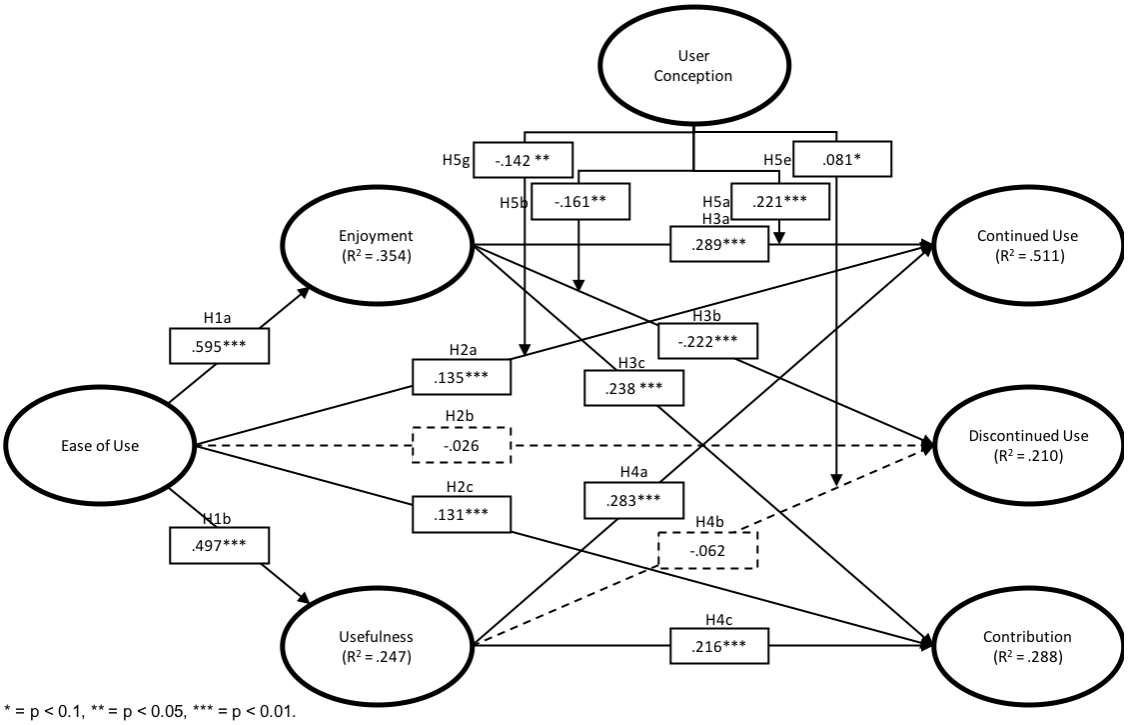

FIGURE 16 Parameter estimates and explained variance of the structural equation model

The findings of this study are two-fold. First, the results confirmed the importance of the construct *user's utility–fun conception* of an information system by showing its significant interaction with user experience on its effect on post-adoption intentions. It was seen that user's conception moderated perceived enjoyment's effect on continued and discontinued use intentions. To clarify, the more fun-oriented the user viewed the system to be, the more this enjoyment positively affected continued use intention and the stronger was its negative effect on discontinued use intention. It was also seen that the more utility-oriented the user conceived the system to be, the stronger was the negative association between perceived usefulness and discontinued use intention (regardless of the insignificant association). These interactions indicate that the effects of the salient antecedents of continued use, namely perceived enjoyment and usefulness, are influenced by how the user conceives the system to be in a fun–utility continuum. In addition, it was seen that the more fun-oriented the user conceived the system to be, the less perceived ease of use positively affected continued use intention.

The second important finding of the study was that perceived enjoyment affected the post-adoption intentions more significantly than perceived usefulness. In fact, perceived usefulness did not have a significant effect on discontinued use intention. These results support the view that gamified systems are dual IS and that their hedonic aspects should not be disregarded when designing these systems or studying user behavior.

This study makes several theoretical contributions. IS literature considers that the nature of an information system determines its use. Utilitarian IS are used for instrumental goals such as productivity and performance increase; and hedonic IS are used for entertainment purposes without following external goals. However, the rise of dual IS through novel developments such as gamification has blurred what determines the use of a system. This research draws attention to users' conception of a system in terms of work vs. fun as an influential factor in system use. It provides a theoretical explanation for this construct and empirically shows its significant effects on system use. In addition, the results show the prominence of enjoyment in the continued use of the subject system, which is encouraging for increased employment of incentive mechanisms such as gamification. Moreover, this research is one of the first to study discontinued use intentions in the context of gamified dual IS.

From practitioners' perspective, the study has several implications. First, it is evident that users conceive the same system differently in a utility–fun spectrum, and their conception affects their continued use. Therefore, practitioners should consider how to meet the needs of different users. One alternative solution might be to provide tailorable interfaces that users can arrange according to their taste. Another solution might be to gauge the users' conception through surrogate variables such as age and gender. Second, the prominent influence of perceived enjoyment shows that practitioners should increasingly design systems that can satisfy users hedonically.

This study was conducted in a collaborative manner. The contributions of the authors are presented in Table 5, in line with the guidelines provided by the Finnish National Board on Research Integrity TENK (Finnish National Board on Research Integrity TENK 2019) and CRediT (CASRAI n.d.).

TABLE 5 Contributions of the authors according to CRediT (Article III)

Author	Role	Definition
Hamari	Conceptualization	Ideas; formulation or evolution of overarching research goals and aims.
Morschheuser	Data curation	Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later re-use.
Morschheuser	Formal analysis	Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data.
Morschheuser	Investigation	Conducting a research and investigation process, specifically performing the experiments, or data/evidence collection.
Hamari	Methodology	Development or design of methodology; creation of models.
Morschheuser	Project administration	Management and coordination responsibility for the research activity planning and execution.
Morschheuser	Resources	Provision of study materials, reagents, materials, patients, laboratory samples, animals, instrumentation, computing resources, or other analysis tools.
Hamari & Morschheuser	Supervision	Oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team.
Morschheuser	Validation	Verification, whether as a part of the activity or separate, of the overall replication/reproducibility of results/experiments and other research outputs.
Morschheuser	Visualization	Preparation, creation and/or presentation of the published work, specifically visualization/data presentation.
Köse	Writing – original draft	Preparation, creation and/or presentation of the published work, specifically writing the initial draft (including substantive translation).
Köse	Writing – review & editing	Preparation, creation and/or presentation of the published work by those from the original research group, specifically critical review, commentary or revision – including pre- or post-publication stages.

4.4 Article IV

Köse, D. B. 2020. "Rolling or Scrolling? The Effect of Content Type on Habitual Use of Facebook," *Twenty-Fourth Pacific Asia Conference on Information Systems*, Dubai, UAE.

This article answers the RQ 4: "How does hedonic and utilitarian content affect the use of a dual system?"

In the context of dual IS, users consume both hedonic and utilitarian content. The focus in this research was to examine how these content types affect satisfaction, habit, use intensity, and discontinued use intention in the context of the social networking service Facebook. In detail, the direct effects of content type on habit and satisfaction and its indirect effects on use intensity and discontinued use intention were analyzed. Figure 17 presents the research model of the study.

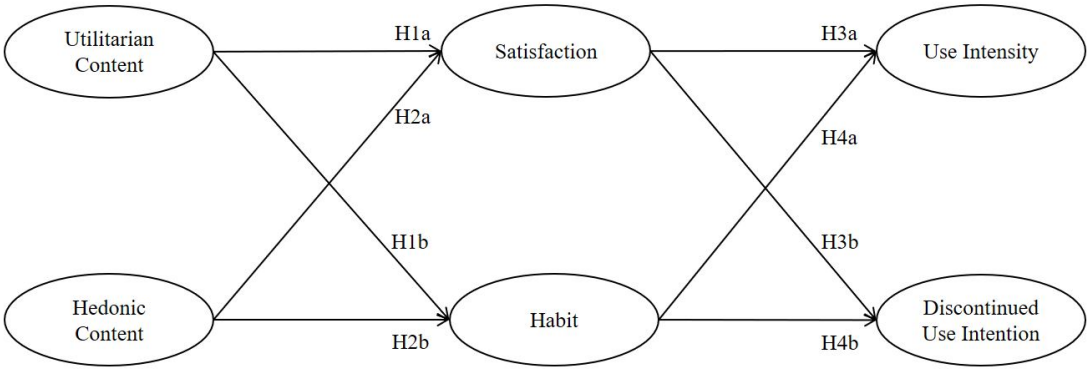

FIGURE 17 Research model

The target population of the survey was foreigners living in Finland. The goal of selecting this sample was to choose a population that benefits from Facebook in a multifaceted way. Foreigners living in Finland use Facebook for various reasons; hence, they constitute a suitable sample for the purposes of this study. The survey sample comprised 142 Facebook users. The theoretical model and the effects of hedonic and utilitarian content were tested using PLS-SEM. The validity and reliability of the constructs and the items were found satisfactory after dropping four items from the content and use intensity constructs. The results of the path analysis supported five of the eight tested hypotheses. Figure 18 presents the results of the analysis.

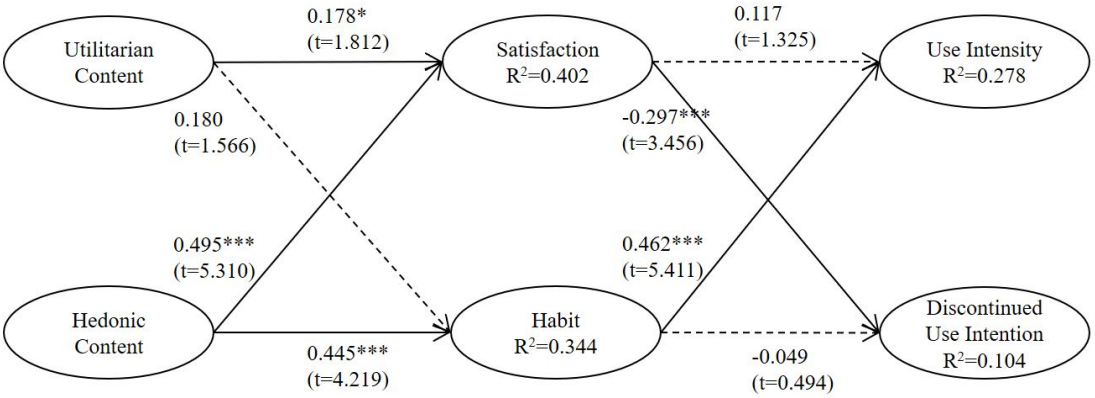

FIGURE 18 Parameter estimates and explained variance of the structural equation model

The findings show that the effects of hedonic content are more dominant than those of utilitarian content in the context of Facebook. In particular, hedonic content has a significant effect on both satisfaction and habitual use. Utilitarian content has a significant effect only on satisfaction, and its effect on habit is nonsignificant. Satisfaction showed a significant negative effect on discontinued use intention, but its effect on use intensity was nonsignificant. In contrast, habit showed a significant positive effect on use intensity, but its effect on discontinued use intention was nonsignificant.

These results have implications for both social networking services and other types of dual systems. One implication is that to increase the usage of a system (i.e., the use intensity), creating habitual use patterns might be one of the methods system managers and designers can look for. They can increase habitual use by enhancing the hedonic content in their system by making the use of content, pictures, icons, messages, and feedback in their system more pleasant and fun for the user. These content types should provide the user with a sense of autonomy, relatedness, and competence, in line with the self-determination theory (Deci and Ryan 2000; Ryan and Deci 2000).

Another implication of the study is related to discontinued use. Satisfaction is a direct antecedent of discontinued use intention. Therefore, users' satisfaction with the system should be balanced by providing them both fun and useful information while they interact with the system. A lack in this balance may negatively affect their satisfaction levels and eventually increase their discontinued use intentions.

Although one of the main purposes of IS is to transfer and represent information, IS literature has mostly ignored how information in its different forms affects user experience. In this article, the effects of different content types on IS satisfaction and habitual use were examined. In that respect, the study investigates a relatively unexplored area with respect to both information artifacts and habitual use of IS. In addition, this study is one of the first to look into the technological aspects that may induce habitual use.

This article is a single-author study.

5 DISCUSSION

This section discusses the implications and contributions of this research in light of the findings. The implications and contributions are presented from both theoretical and practical perspectives. In addition, the limitations and directions for future research are reviewed.

From a theoretical perspective, the findings extend existing knowledge on dual IS. They provide design insights to practitioners that work with different types of dual IS. Table 6 summarizes the research questions, key results, and contributions.

TABLE 6 Research questions and summary of results and contributions

Research question	**Summary of results and contributions**
RQ 1 What resources contribute to the utilitarian use of IS, particularly social media services?	- Social networking services should be classified as dual IS. - Content is a resource for the hedonic and utilitarian use of IS. - An information system can serve different purposes using external resources such as complementary services. - Theorization of the adaptation of IS to dual IS
RQ 2 What factors affect the adoption and post-adoption of dual IS?	- Two research models showing the effects of the studied factors on the adoption and post-adoption of dual IS. - From the perspective of IS artifacts (Iivari 2017), factors related to the information artifact are ignored in the extant literature. - An increasing number of IS are viewed as providing both hedonic and utilitarian benefits.

continues

TABLE 6 continues

Research question	Summary of results and contributions
RQ 3 How does a user's conception of the purpose of a dual system affect their use intentions?	- The conceptualization of the construct *user's conception of a system's purpose* - *User's conception of a system's purpose* proves to be an influential construct showing interaction with perceived benefits on their effects on (dis)continued use intentions - A primary research that studies discontinued use intention in the context of dual IS. - A primary research that studies discontinued use intention in the context of gamified systems.
RQ 4 How does hedonic and utilitarian content affect the use of a dual system?	- A primary research to study the relationship between content type and habitual use and discontinued use intention in the context of IS. - Hedonic content is predominant in terms of its effects on habitual use and use intensity. - Utilitarian content should not be neglected to ensure user satisfaction.

5.1 Theoretical Implications

This thesis makes several theoretical contributions and has implications particularly with respect to dual IS. These contributions and implications are related to the adaptation of IS to dual IS, an updated review on dual IS, the concept of user's conception and its effects, and content type and its relation to various user experience dimensions.

As mentioned in section 2.2, the adaptation of IS has been studied from various perspectives. However, a perspective regarding the hedonic and utilitarian use is lacking. In Article I, this gap is filled by developing a model that combines ST and service science. This model aims to explain how hedonic- or utilitarian-only systems transform to provide both benefits through the appropriations of their users. Through the lenses of this adaptation model, one may gain predictive power/insight regarding the possible divergent uses of a system.

The results of Article I highlight the importance of content and how it can serve different purposes of the users. Furthermore, they showcase how a system designed for hedonic purposes can also be used in a multipurpose manner (i.e., both hedonic and utilitarian purposes) when combined with other services and resources in its network.

The literature review on dual IS (Article II) provides a bird's-eye view of dual IS. First, it uncovers that an increasing number of IS are now considered dual IS and used in a multipurpose manner. Among these IS are online shopping services, social networking services, gamified services, virtual worlds, online multi-player games, and mobile museum guides. This finding implies that adopting a dual IS view to contemporary systems can benefit both researchers and practitioners to have a wider perspective of the factors affecting the use of a

system. This inference is particularly true in the presence of gamification and its growing application in different types of systems.

This study also provides two research models that bring together the factors that influence the adoption and post-adoption of dual IS. These factors can be studied in the context of different types of dual IS. A comparison of these two models shows that, as expected, a richer amount of factors were studied with respect to the adoption of dual IS. Therefore, this line of research can provide future research directions regarding the post-adoption stage of dual IS. The two models also reveal that the information artifact is considerably less studied than the social and technology artifacts. This implies that content in its various forms can provide avenues for future research.

Articles I and II prove that IS are viewed from the different perspectives of fun and utility. Some may classify them as hedonic systems, whereas others may classify them as utilitarian. Some may also appreciate both kind of benefits from the use of these contemporary technologies and adapt them for various uses depending on their needs. Having acknowledged these different user perspectives, in Article III, we develop the construct *user's conception of a system's purpose*. The analysis of its interaction with perceived benefits (i.e., perceived enjoyment, usefulness, and ease of use) on their effects on post-adoption intentions (i.e., continued use intention, discontinued use intention and contribution intention) reveals the importance of this construct. Therefore, user's conception of the purpose of a system should be taken into account while designing dual IS and studying the influential factors in their context.

In support of the findings of Article II, Article III provides further evidence that gamified systems are dual IS. This inference stems from the more prominent effects of perceived enjoyment in contrast to perceived usefulness on post-adoption intentions.

The research model in Article IV studies previously unexplored relations with respect to hedonic and utilitarian content. The contribution is particularly significant with respect to habitual use and discontinued use intentions in the context of IS. Habitual use of IS has been studied mainly from the perspective of user characteristics such as age (e.g., Turel 2015), usage behavior (e.g., usage frequency and usage comprehensiveness (Barnes 2011; Limayem et al. 2007; Limayem and Cheung 2008; Turel and Serenko 2012)), and user perceptions (e.g., perceived enjoyment and satisfaction (Barnes 2011; Turel 2015; Turel and Serenko 2012)). However, previous research has neglected the aspects of technology that induce habitual use, particularly with respect to content. Therefore, this study is one of the first to analyze the relation between content type and habitual use of technologies.

The same analogy is also valid for discontinued use intention. Soliman and Rinta-Kahila's (2020) review showed that the studied antecedents of discontinuance are mainly related to the enablers and inhibitors of adoption, expectation-reality gap, system performance (e.g., task–technology fit), users' psychological welfare, and strategical, ethical, or legal reasons. However, no study on the relation between hedonic and utilitarian content and IS

discontinuance has yet been conducted. Moreover, this phenomenon is mainly studied from the perspectives of hedonic and utilitarian IS, leaving out the perspective of dual IS (Soliman and Rinta-Kahila 2020). In that respect, Article III contributes to discontinued use literature by studying its antecedents in the context of a dual gamified system.

Overall, this thesis has made valuable contributions to IS literature from several perspectives. First, it updates the current knowledge on dual IS: it provides a theoretical model that explains the adaptation of hedonic- and utilitarian-only systems to dual systems and brings together factors found to be influential in the adoption and post-adoption of dual IS. Second, it develops the construct *user's conception of a system's purpose* and demonstrates its effects. Third, it showcases the importance of content: how it can be used for different purposes and how it can affect users' experience with the system. Fourth, it contributes to the literature on the habitual use of IS by studying the influence of technology-centric factors (i.e., content type). Last, it contributes to the literature on the discontinued use of IS by studying this phenomenon in the context of dual IS, particularly gamified systems.

5.2 Practical Implications

The practical implications of this thesis are manifold. These implications are mainly targeted toward the design of dual IS that may involve different types of systems such as social media services, gamified systems, and online shopping services.

Contemporary technologies are increasingly serving dual purposes—that is, hedonic and utilitarian purposes. Similarly, users are increasingly demanding both types of benefits from these systems. Therefore, system managers and designers should work on designing systems that can provide both types of benefits.

A starting point to consider in the design of these systems is the recognition that users may conceive dual IS differently. This conception may affect their experience to the point that they abandon using the system or switch for an alternative that better suits their taste. These differences and effects mainly stress the importance of providing personalized experiences to users according to their preferences and contexts. System designers and managers may cater for these differences by evaluating their target user group. This evaluation may involve age and gender being used as surrogate variables to measure the possible user's conception of the purpose of the system. Otherwise, alternative user interfaces may be offered to the users so that there is room in the system design to accommodate users' different conceptions and preferences.

Another point to consider is that the resources in the systems network may enable the use of the system for different hedonic and utilitarian purposes. Considering these resources and sustaining their existence may expand the user base of the system. In fact, it may also contribute to the system's advancement.

Note that the sustainment of these resources should be in line with the company's strategies and possible ethical and legal repercussions of the system use.

The two models presented in Article II provide system designers and managers with a comprehensive list of factors and how they may affect system use. Therefore, these models can be used as a basis when designing, developing, or marketing different types of dual IS.

Although largely ignored in the literature, content in its different forms proves to be an influential factor of system use. Its relation with habitual use and satisfaction is evident. Therefore, system designers and managers should consider ways to manipulate content in both hedonic and utilitarian ways to provide for an optimal user experience. In addition, they should keep in mind the different forms of content: images, emojis, icons, avatars, a video game's layout and background, the messages and feedback received from the system, etc. While catering for these different forms of content, they should take into consideration that hedonic content has greater influence than utilitarian content on the habitual use of the system. Nevertheless, utilitarian content is essential for user satisfaction. Therefore, a right balance should be achieved between these different types of content.

5.3 Limitations

The thesis has certain limitations, some of which may provide avenues for future research. These limitations are discussed based on the limitations of social media data, systematic literature review, survey data, and the PLS-SEM data analysis method.

The use of social media data in qualitative research involves certain challenges related to, for example, its volume, lack of visual cues, lack of control over the conversation, and authenticity of the participants (Mckenna et al. 2017). With respect to this thesis, the limitations stemming from social media data are related to its lack of depth in informativeness regarding the research questions. In other words, there was no direct conversation between the researcher and the Twitter account owners. Therefore, the researcher was not able to ask focused questions about the topic to understand the goals and mental processes of the Twitter account owners. This aspect of the study can provide avenues for future research.

As mentioned in section 4.1, social media data does not completely reflect the adaptation process of the social media service. However, they point out the use of both external and internal resources in the utilitarian use of the Twitter service. Therefore, they show an instance of such utilitarian adaption of a service, which was initially designed for hedonic use. However, the theoretical model can be derived by looking at the service in a retrospective manner.

The systematic literature review method was previously criticized by Boell and Cecez-Kecmanovic (2015). Keeping these criticism in mind, with respect to this thesis, one limitation of the conducted systematic literature review in Article

II is the lack of application of quality appraisal, as suggested by Okoli and Schabram (2010). However, this step was skipped to provide an extensive coverage of the influential factors studied in the extant literature. Therefore, considering the focus of the study (in Article II), skipping quality appraisal provides a more comprehensive overview of the topic.

Another limitation may stem from the use of PLS-SEM for data analysis. There are criticisms toward PLS-SEM owing to concerns related to, for example, the optimality of PLS weights and capitalization on chance (e.g., Rönkkö et al. 2016). However, PLS-SEM is still a convenient and accepted solution, particularly in cases of small sample sizes and exploratory studies. However, the results of these analyses can still be compared with, for example, covariance-based structural equation modeling using larger samples (especially with respect to Article IV).

The limitations of this thesis are also discussed in the respective sections and summaries of the articles. Despite these limitations, the thesis successfully answers the research questions and provides an updated review of dual IS.

5.4 Recommendations for Future Research

The findings and limitations of this thesis can provide avenues for future research. These avenues are discussed with respect to the methods chosen, factors studied, and different types of dual IS.

One path for future research may be to focus on the limitations of Article I. This can be achieved by collecting longitudinal data from both the users' and the designers' sides. The observation of the change of use and the kind of resources used during this time frame can provide more robust support for the model presented in this article.

Another path to improve this research (Article I) may involve interviews and surveys with users that post advertisements on social media. This can provide more in-depth knowledge regarding the kind of resources these users utilize to gain utilitarian benefits (e.g., to earn money).

The two models presented in Article II can provide a number of avenues for future research when analyzed in more detail. One way to build on this research is to compare the factors left unstudied in either the adoption or post-adoption of dual IS. Another way is to study the effects of the factors left unstudied in different types of dual IS. These avenues for future work are discussed in more detail in section 4.2.

Although the two models provided in Article II are relatively comprehensive, they can still run short of fully covering the factors. This is because the review included only those papers that explicitly claimed their subject system as dual in the original articles. Future work can complement these two models by focusing on one type of dual IS (e.g., social networking services or online shopping services) at a time. In this way, the reviews can be practically

manageable. Furthermore, these models can be empirically tested to analyze the effects of different factors.

The lack of studies with regard to the information artifact and its different forms was mentioned in different parts of this thesis. This avenue can be further explored: How does content in its different forms relate to technology use and its various antecedents? The antecedents to be studied may be user-related (e.g., user demographics and use motivation), technology-related (e.g., screen size and connection quality), user-perceptions–related (e.g., perceived enjoyment, trust, and information risk), and so on.

Research regarding the habitual use of IS is still at a nascent stage. This is particularly true with respect to IS features that may be related to habitual use. In this thesis, habit's relation with hedonic and utilitarian content was studied. Nevertheless, there are abundant possibilities for research regarding different technology features and their relation with habitual and addictive use. A particular focus on longitudinal experiments can provide more reliable results and design implications.

Discontinued use intention was another point that was studied in this thesis. Future research may extend the findings by studying the different forms of discontinuation (Soliman and Rinta-Kahila 2020) in the context of dual IS.

Overall, researchers are encouraged to follow these recommendations for future research or draw inspiration from them.

YHTEENVETO (FINNISH SUMMARY)

Nykyteknologiat ovat yhä useammin monikäyttöisiä. Esimerkkinä voidaan mainita yhteisöpalvelut, pelillistetyt sovellukset ja verkkokaupat. Twitteriä ja Instagramia käytetään mainostamiseen ja Facebookia myyntiin, poliittiseen kampanjointiin ja verkostoitumiseen. Videopelien striimaaminen Twitchissä tuottaa lahjoituksia (juomarahaa), jäsenmaksuja ja sponsorointituloja palveluntarjoajalle. Pelillistettyjä sovelluksia (esim. Fitocracy, Pokemon Go, CodeSpells) voidaan käyttää joko peleinä tai välineinä. Tämän mahdollistaa näiden teknologioiden joustavat ominaisuudet, kuten käyttäjän luoma sisältö, teknologian leviäminen kaikkialle siirrettävien järjestelmien kautta tai sellaiset ominaisuudet, jotka voivat tuoda sekä huvia että hyötyä. Tällaisia teknologioita nimitetään "monikäyttöiseksi tietojärjestelmäksi", jota voidaan käyttää huvi- ja hyötytarkoituksessa samanaikaisesti tai erillisesti kontekstin mukaan.

Aiemmassa tutkimuksessa monia näistä teknologioista on luokiteltu eri tavoin. Joku luokittelee ne hedonistisiksi järjestelmiksi, toinen utilitaristisiksi järjestelmiksi. Yksipuolinen luokitus voi tuottaa puolueellisia tuloksia tutkimuksessa ja kehityksessä. Siksi niiden eri käyttö täytyy tunnistaa vakiintuneen määritelmän avulla.

Tutkimukset, jotka käsittelevät monikäyttöistä teknologiaa, ovat keskittyneet neljään pääuomaan. Ensimmäisessä fokus on monikäyttöisen teknologian omaksumisessa. Toinen analysoi näiden teknologioiden käytön jatkuvuutta käyttäen eri teoreettisia näkökulmia. Kolmas soveltaa meta-analyysia näistä teknologioista ja vertaa hedonistista ja utilitaristista tekijää sekä sitä, miten ne vaikuttavat käyttöaikomukseen ja käyttöön. Neljäs puolestaan vertaa erilaisia tekijöitä ja sitä, miten niiden vaikutukset muuttuvat hedonistisen ja utilitaristisen käytön välillä.

Tietojärjestelmien elinkaari sisältää neljä vaihetta: altistuminen, omaksuminen, käytön jatkuminen ja käytön lopettaminen. Kuitenkin monikäyttöisten tietojärjestelmien käytön lopettamista on tutkittu selvästi vähemmän. Lisäksi tietoaspekti on jäänyt huomiotta valtavirran tietojärjestelmätutkimuksessa. Sitä paitsi monikäyttöistä tietojärjestelmää voidaan pitää erilaisena ja käyttää monin eri tavoin. Siksi monikäyttöisen teknologian määritelmää täytyy päivittää, jotta teknologian kehittäjät ja johtajat voivat löytää eri näkökulmia ja onnistua teknologian suunnittelemisessa.

Väitöskirja osoittaa, miten utilitaristiset ja hedonistiset tietojärjestelmät mukautuvat monikäyttöön, päivittää tietoa monikäyttöisestä tietojärjestelmästä sekä analysoi erilaisia tekijöitä ja niiden vaikutusta monikäyttöisen tietojärjestelmän käyttöön. Keskittyneitä teknologioita ovat sosiaalinen media ja pelillistetyt sovellukset, jotka on luokiteltu hedonistisiksi järjestelmiksi aiemmassa tutkimuksessa. Väitöskirjan empiirinen osuus sisältää sekä määrällisiä että laadullisia tutkimuksia, jotka on raportoitu neljässä tieteellisessä artikkelissa.

Väitöskirjan keskeinen teoreettinen kontribuutio on sen luoma uusi arvokas tieto monikäyttöisistä tietojärjestelmistä ja niiden käytöstä. Lisäksi väitöskirja tarjoaa löydöksien pohjalta päätelmiä ja suosituksia, jotka hyödyttävät teknologian kehittäjiä ja johtajia.

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ORIGINAL PAPERS

I

UTILITARIAN USE OF SOCIAL MEDIA SERVICES: A STUDY ON TWITTER

by

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Utilitarian Use of Social Media Services: A Study on Twitter

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Abstract

This paper applies structuration theory (ST) and service dominant logic (SDL) as lenses to study different uses of information systems (IS). We argue that resources provided by IS may be combined and reproduced by appropriating them for different purposes than the design purposes of the IS. The study provides empirical data and analysis to showcase the use of resources for utilitarian purposes in the context of social media services (SMS). Through an analysis of sponsored tweets on Twitter, we show that users employ implicit and explicit resources for utilitarian outcomes. Our findings imply that users create their own service through appropriation of resources available in the social context of service use; hence, they induce different adaptations of the information system.

1. Introduction

IS have branched out from organizational contexts and they are now used in different aspects of daily life for various purposes. Examples include but are not limited to social networking services, video games, e-commerce websites, online banking services and crowdsourcing platforms. One important characteristic of these services is that they reside in a sphere in which the service provider has no direct control over how users utilize the information system. In addition, the flexibility that has come with Web 2.0 (i.e., enablement of users as content creators) has provided users the freedom to decide how to use IS according to their own imagination, needs and purposes.

This ability to determine the benefit, and the lack of control in IS use enable their adaption for various purposes. Utilitarian IS may be used for hedonic purposes, hedonic IS may be adapted to utilitarian use; moreover, resources external to IS may contribute to these different uses. One case of such adaption is utilitarian use of SMS for monetary purposes. For instance, some Twitch broadcasters make a living out of streaming their games through tips, subscriptions and even through merchandise or sponsorships [1]. Instagram and Facebook host a growing number of people who earn money by posting advertisements of brands [2, 3]. Facebook is launching its marketplace tool to ease buying and selling as a result of the fact that one quarter of the site's visitors trade on it, and there are more than 450 million buying and selling groups [4].

The mixing of hedonic and utilitarian values in IS is growing, and previous research has looked into effects of hedonic and utilitarian value on technology acceptance (e.g., [5, 6]), the change of use motivation over time (e.g., [7–9]) and use of the same information system for both hedonic and utilitarian purposes (e.g., [10, 11]). However, no previous study was found regarding resources conducive to these different uses of IS. Accordingly, the research question of this study is, *What resources contribute to utilitarian use of IS, particularly SMS?*

With this purpose in mind, the study investigates utilitarian usage of Twitter by screening sponsored tweets posted by people. Here *people* refers to those who are not celebrities and is distinguished by the absence of the "verified" badge provided by Twitter. Sponsored tweets provide monetary gains to their owners; hence, they are a source of utilitarian value in the form of extrinsic rewards. Sponsored content was chosen for analysis instead of other utilitarian use types because today users are bombarded with information and there is increasing concern regarding the transparency of this information and what is genuine content and what is not. Above all, owners of this type of content make use of various resources to receive monetary gains from their social media accounts. Therefore, to study this, we analyzed accounts posting these tweets to extract their profile characteristics and tweeting behavior, which in turn helped identify what resources they used.

The study is explorative in nature; however, it draws on ST [12] and SDL [13, 14] for analysis of the data and presentation of the results. Based on our findings, we argue that utilitarian use of SMS is enabled by resources available within the social context of service use and by the different meanings people attribute to these resources. Different combinations of resources and values result in separate uses of the same service. From that perspective, ST is suitable for analyzing the

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processual change of IS use by treating them as social systems that interplay with their users. On the other hand, SDL provides a motivational perspective (values of the IS users) and concentrates on operating on resources in contrast to controlling resources as in ST [15].

The results inform us about the kinds of resources people employ in the utilitarian use of SMS, particularly in the case of Twitter and sponsored content. Previous literature has focused on usability and functionality in terms of IS features (e.g., TAM studies) and has emphasized the organizational or educational contexts when studying utilitarian use. However, the findings of this study suggest that utilitarian use of IS is not bound to these contexts; moreover, it is also resources external to IS that enable their utilitarian use. The analysis shows that people employ both direct and indirect network externalities together with online identities as resources in the case of sponsored tweets.

We argue that acknowledging the utilitarian input of resources other than IS features is important for several reasons. First, it enhances knowledge on IS use. Second, it provides a new standpoint for IS design and user engagement. And finally, it offers foresight into how IS may diverge from their design purpose.

The paper is organized as follows. In the next section we briefly introduce online advertisements. Thereafter, we provide the theoretical background of the study. This is followed by the research methodology and results. Last, we discuss the findings and our conclusions and consider the study's limitations and potential avenues for future research.

2. Online advertisements

The Internet is more or less a level playing field for advertisements, as it provides fair reach to resources; besides, establishing an initial presence online is relatively easy and low cost, and it provides reach to an international audience [16]. Furthermore, online social networks facilitate this usage by providing a platform comprised of networked people. According to *The Economist* [17], publishing advertisements on social media accounts is a growing business among celebrities. Yet, it is not only the celebrities who get sponsored for advertisements. People who are not of public interest have also started using social media for monetary gains.

Consequently, there is increasing control of online sponsored content. The Federal Trade Commission (FTC) [18] states that online advertisements including those on social media need to incorporate clear and conspicuous disclosures. Furthermore, they elaborate that the disclosure should exist in each advertisement in a space-constrained ad, like those in tweets. Likewise, the Word of Mouth Marketing Association (WOMMA) recommends that, alongside the existence of a material connection between the speaker and the company and/or brand, disclosures should be made not only for ethical and responsible communication but also to avoid monetary, regulatory or legal risks [19].

One way to make money via online accounts is to publish sponsored content (e.g., sponsored tweets). Sponsored tweets are messages posted on Twitter and sponsored by an advertiser to create word of mouth with the aim of reaching potential customers. There is a growing business network around social media advertising; for instance, services such as adly and SponsoredTweets bring together advertisers and advertisement publishers. Relatedly, Park, Lee, Kim and Chung show that online advertisements are more effective when the publisher has a large audience (i.e., has a high number of followers) and is actively engaged with the online social network (i.e., publishes a high number of posts) [20]. Other services (e.g., Hootsuite, quintly) enable brands to measure and boost their social media impact, identify key interacting users, conduct tweet analysis and perform many more activities.

3. Theoretical background

Here we review ST [12] and SDL [13, 14] to explain the adaptation of SMS. The term adaptation stands for emergence of new use types in the context of IS. In this explanation, ST helps us understand the processual change of SMS use, and SDL elucidates the role of values and resources in this change.

First, ST was developed by Giddens [12] to explain the recursive change in social systems through reflexive and knowledgeable actions of human agents. It has been applied to IS in many studies that investigate the processual change of IS and IS use by their users' adaptions (see, e.g., adaptive structuration theory [21]).

In our study, we will take on four main concepts of ST: agents, structures, systems and the duality of structure. Agents are the knowledgeable human actors who act purposefully, rationally and by monitoring their actions reflexively. Structures are the rules and resources of a social system. They both enable and constrain people's actions and, at the same time, are recursively formed by these same actions as properties of the system. As for systems, they comprise the relations and regular practices of actors and collectivities that are organized and reproduced in interaction settings. The last concept, duality of structure, considers that the properties of social systems transform recursively as a result of the practices they accommodate; they are both a medium and an outcome of these practices.

IS are combinations of rules and resources designed for specific purposes. Yet, different configurations of these IS rules and resources suited to given conditions result in different types of uses. In this process, acknowledging the knowledgeable and reflexive nature of human agents provides an understanding of their interpretive uses of IS [22]. At this point, SDL's customer-centric approach to IS provides a better understanding of IS adaption into different uses and their corollary adaptations.

SDL emphasizes customer-determined value through the application of resources for the benefit of a party or the party itself [13, 14]. According to SDL, value is a judgment of the increase or decrease in the well-being of an entity in some respect and is an experiential concept determined individually and contextually. It is the apprehension of the resource integration process and the result of service experience.

According to SDL, users derive two types of value from IS: utilitarian and hedonic. Utilitarian value is incentivized by IS users' extrinsic motivations [6, 23]. It is driven by conscious pursuit of intended outcomes [24]. Tasks and accomplishments are prominent for users with utilitarian orientation; hence, they approach IS use rationally [25]. Instead of being an end, IS usage becomes a tool for achieving a goal; therefore, usability and functionality gain importance. Within utilitarian IS, user efficiency and performance are prominent, and hence, utilitarian value is quantifiable in terms of objective measures [26].

On the other hand, hedonic value is driven by intrinsic motivations [6, 23]. It represents activities pursued out of inner interests without external pressures [27]. Hirschman and Holbrook view it as the essence of consumers' psychological experience [28]. They state that it is about emotional arousals, multisensory images and fantasies; in other words, the activity may cause historic imagery through reminders of past events or fantasy imagery by evoking users' imaginations. Moreover, they state that hedonic value is affected by the social aspects of consumer experience; therefore, instead of its objective attributes, what the information system represents gains importance. For these reasons, hedonic value is a subjective concept and difficult to measure [26, 28].

Hedonic or utilitarian, value is determined in use and stems from the application of operant resources that may be transferred through operand resources. Operand resources are physical, static and finite materials and may be manipulated for beneficial use. They are mostly natural resources that become a resource when humans find a use for them. On the other hand, operant resources are intangible competences (i.e., skills and knowledge) that act on operand resources to produce effects. These effects may enhance the value of physical properties or reproduce operant resources [13].

SMS create their own version of social systems with their underlying programming code, relevant end-user license agreements and terms of service [29]. What is more, their flexible nature in terms of the miscellaneous resources they provide enables their adaption for different purposes. Users of these services determine and propose value by utilizing these various resources. The resources they employ may be their own skills and knowledge, or they may also be of an operand nature. As Hilton and Hughes put it, IS embody codified operant resources of the service provider, and these embedded resources become operand resources for the benefit of IS users [30].

Among the resources available on SMS are network externalities, presentation of online identity and features intrinsic to the social media services.

The value consumers derive from a service is dependent upon other agents in the service network [31]. When the value of membership is positively correlated with the number of other users or the network size, those markets are said to exhibit "network effects" or "network externalities" [32]. Network externalities are often conceptualized with two constituents: direct network externalities and indirect network externalities. Direct and indirect network externalities are extrinsic attributes of a service, compared to its intrinsic attributes such as its functionalities, technical specifications or accessibility [33].

Direct network externalities stem from other users of the service [31, 34]. In the context of SMS, it may be conceptualized as, for example, the number of contacts on the service. Zheng, Salganik and Gelman found that the median number of acquaintances one has is 610, with 90% of the population having an expected number of contacts between 250 and 1710, according to their analysis of 1370 individuals in American society [35]. However, through SMS, the number of people one can reach or have in one's circle may be tens of thousands or even millions.

Indirect network externalities occur as a result of complementary services related to the original service [31, 34]. These complementary services enhance perceived value for users, as they augment available actions [36]. For instance, the Twitter developer network offers various services by making use of Twitter data and developer tools. One example is quintly, which provides services for follower and tweet analysis, interaction analytics, customer care metrics and identification of key interacting users [37]. Another example is Hootsuite, which offers services for measuring and boosting Twitter impact [38].

Finally, online identity is another important resource on SMS. This is because these services provide a

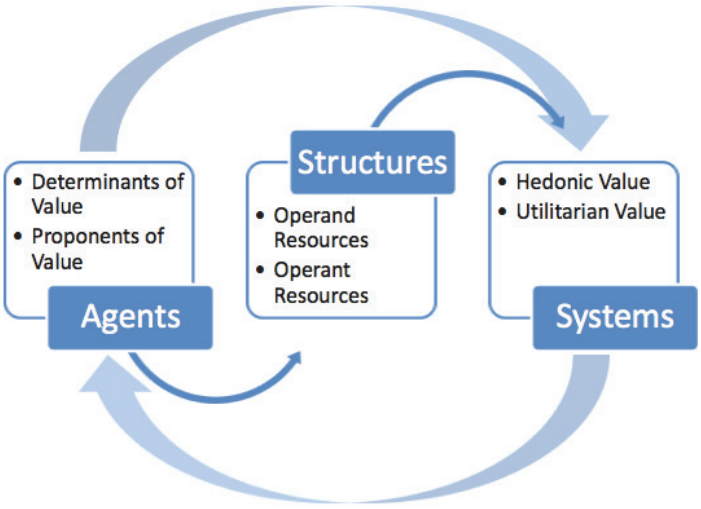

Figure 1. Adaptation of social media services

separate medium than the offline world for identity production. Their features enable the portrayal of different identities formed through concepts of lifestyle, connections and media consumption [39]. In Sundén's words, they allow members to "type oneself into being" [40]. As Miller indicates, one type of online identity presentation is self-promotional, which is similar to the display of an electronic curriculum vitae or of services provided by the person [41]. However, this display is dependent upon the sense of an actual and imagined audience [39]. According to the imagined audience, profile owners use various methods to target different followers, balance authenticity and perform self-censorship [42].

By recognizing these resources and applying their own competencies, agents use SMS for hedonic or utilitarian values. Proliferation of these uses, in turn, results in their acceptance and integration into the service. This is a recursive process in which users' activities on the service change the service, which in turn affects again how people employ the information system. Figure 1 above depicts this process: Users of the social media service become proponents and determinants of value, and according to the type of their usage, they employ different sorts of resources. The social media service, in turn, provides hedonic or utilitarian value according to how it is used. Users' choice of resources is depicted with the arrow from agents to structures, and the employment of varying resources to deliver hedonic or utilitarian value is indicated with the arrow from structures to systems. Yet, it should be noted that these arrows do not represent causal relationships; rather they indicate that users "determine/provide" value according to the resources they "identify." The loop displays the interplay between social media users and the service. As users' different employments proliferate, they become part of the service's value proposition.

4. Research methodology

The methodology of this research study analyzed data directly extracted from Twitter. First, we collected data in two different ways to encompass various uses. Second, we applied filtering and randomization techniques due to the amount of collected data so that it is feasible to manually analyze the data set. The following sections describe the methodology in detail.

4.1. Data collection

Data collection was done in two steps. The first step involved collecting Twitter accounts created in the name of G20 leaders and the top 21 Twitter accounts with the highest number of followers according to Twitter Counter [43]. These accounts were collected because public identities were deemed to be resources for online identity presentation on SMS. The second step involved streaming tweets that contained advertisement hashtags.

For the first step, the collection of accounts and tweets for public personas was conducted during the third week of February 2017. In order to extract Twitter users' screen names, we used the Twitter API function "users/search" [44]. This API function returns 1000 accounts with a matching full name or other criteria. We used the first and last name of each public person in quotes as the function parameter; therefore, we performed 42 requests. However, as each query returned a maximum of 20 results, we had to query the API

function repeatedly. As a result of the execution of the aforementioned procedure, we obtained a list of Twitter screennames corresponding to the names of the 42 public persons in question. Next, we used the API call "statuses/user timeline"; this call retrieves data on the 3200 most recent public Tweets of a user specified in the parameter. Data are represented as a JSON (JavaScript Object Notation) object containing a number of fields, such as status text, date, information on retweet, and so forth. We refer the reader to [45] for a detailed description of the object. The collected data were stored in MongoDB NoSQL database [46]. The result of this collection is presented in Table 1 below. The collection of profiles created in the name of the selected 42 personas resulted in a total of 28,529 Twitter accounts; their timeline posts totaled close to 36.6M tweets.

Table 1. Descriptive statistics for accounts and tweets collected per public persona

Statistics	Accounts	Tweets
Mean	679.26	871,177.1
Standard deviation	400.62	846,194.3
Min.	0	0
Max.	1,000	2,438,334
Median	988	664,058.5
Sum	28,529	36,589,439

The second step collected tweets according to their hashtags using streaming API. For hashtags, the words "advertisement" and "sponsored" and their abbreviations were used. These two words were chosen because they were the two referred examples in both FTC regulations and WOMMA guidelines. The hashtags were chosen according to their usage frequency. A cross-check of the hashtags via top-hashtags website [47] showed their popularity as demonstrated in Table 2 below.

Table 2. Popularity of advertisement hashtags

Hashtag	Usage Amount	Hashtag	Usage Amount
#ad	3.38M	#sp	10.15M
#advert	152.0K	#spon	101.2K
#advertisement	580.8K	#sponsored	577.5K

Hence, #ad, #sp, #advertisement and #sponsored hashtags were used for the collection: tweets that contained these hashtags were collected for 24 hours together with the profile information of their owners. As a result, nearly 72K tweets were collected.

4.2. Data analysis

Analysis of the two data sets was done separately. Analysis of the first data set was conducted in two steps: The initial step distinguished unverified profiles that have advertisements in their tweets; the second step analyzed characteristics of these advertising profiles from qualitative aspects.

4.2.1. Analysis of the first data set. The initial phase of analysis commenced by querying tweets containing strings and hashtags that indicate an advertisement. Indication of the advertisement was established by the existence of "advertisement" and "sponsored" words, their abbreviations and hashtags. To this end, the queries extracted tweets that contained strings of "ad," "advert," "advertisement," "sp," "spon" and "sponsored"; and their hashtags "#ad," "#advert," "#advertisement," "#sp," "#spon" and "#sponsored." The numbers of tweets resulting from these queries are presented below in Table 3. Due to the high number of tweets in "ad" and "sp" files, they were downsized to their 10% by randomization. In the end, there were 3661 tweets in the ad and 854 tweets in the sp file. In conclusion, a total of 12,796 tweets were analyzed.

Table 3. Results of tweet queries

Query String	Number of Tweets	Query String	Number of Tweets
ad	36,793	sp	8,348
#ad	2,262	#sp	302
advert	1,427	spon	0
#advert	12	#spon	426
advertisement	960	sponsored	2,363
#advertisement	6	#sponsored	523

The resulting tweets from the queries were analyzed manually in order to distinguish whether they were advertisements. During this content analysis, tweets showing certain characteristics were eliminated. For instance, tweets in the "advert" and "advertisement" files mostly stated opinions about running advertisements, so they were not sponsored tweets. "Sp" mostly stood for São Paulo, or a political party. The word "sponsored" was also used to share externally sponsored events: announcing an event that was sponsored—these weren't classified as advert. Besides this, there were topics related to politics and government that included phrases such as "government sponsored," "state sponsored," "sponsored terror" and "sponsored bill." Advertisements for jobs were discarded, as it was assumed that they weren't sponsored. Tweets from

accounts that were sharing their own sponsorship were not counted as sponsored. Posts related to giveaways or sweepstakes were also eliminated.

After screening the tweets, corresponding profiles were marked. Only unverified profiles were transferred to the second step of the analysis due to the assumption that verified profiles belonged to people who are assumed to act in the interest of the public.

In the second phase, compiled advertisement tweets and their associated profiles were analyzed once more to ensure that they were posting sponsored tweets. Profiles were coded and classified according to the purpose stated in each profile bio; tweets were coded according to the type of advertisements and Web links they posted. Profiles were also analyzed according to other profile information, which included profile picture, profile name, number of contacts (followers and followings), profile creation and last activity date, number of tweets, number of retweets, number of received retweets and posted URLs, photos and videos. The profiles that did not have multiple sponsored posts and did not otherwise indicate an advertising purpose in their bios were eliminated.

4.2.2. Analysis of the second data set. Prior to analysis of the second data set, it was first cleaned of retweets; then, the remaining tweets were downsized to a random 10% of the original, which resulted in 3360 tweets. Afterward, the analysis followed a different procedure compared to the first data set due to the amount of resulting profiles. The tweets were content-analyzed multiple times, first to distinguish advertisements from non-advertisements. Then, advertisement tweets were coded according to the links, the frequency of the same type of links they posted and the description of the profiles. For this, the links shortened by Twitter were reverted back to their original forms. Coding of the Web links enabled discovery of the services that were used for advertisements.

5. Results

The results of the analysis show that advertising accounts used miscellaneous resources. These resources were of both operand and operant nature. An overall classification of these resources resulted in two main groups: network externalities and online identity. Network externalities were further divided into direct and indirect network externalities. Furthermore, it was seen that the accounts used different combinations of these resources to extract utilitarian value from Twitter. In most cases, the accounts described the nature and purpose of the Twitter profile in their bios.

5.1. Network externalities

5.1.1. Direct network externalities. In the context of Twitter, direct network externalities stem from the social network reached through Twitter, in other words, the number of contacts. They enable users to accumulate potential social capital.

The analysis of the accounts showed that many of them had a very high number of followers or followings outside the boundaries identified by Zheng et al.'s study [35]: 250–1710. In the first data set, 73 advertising accounts were identified with a mean of 2281.88 followings and 30,976.93 followers, and a median of 1575 and 3691, respectively. Table 4 displays descriptive statistics for the number of followings and followers of advertising profiles in the first data set; Figure 2 shows the frequency of accounts (y-axis) per number of followers in the specified intervals (x-axis). As may be seen in the table, there is a substantial difference in the numbers between the followings and the followers. This might be due to the prominence of follower numbers for the social reach of advertisement tweets.

Table 4. Descriptive statistics for following and follower numbers in the first data set

Statistics	Following	Follower
Mean	2,281.88	30,976.93
Standard deviation	3,007.24	163,052.10
Min.	0	91
Max.	21,263	1,375,260
Median	1,575	3,691

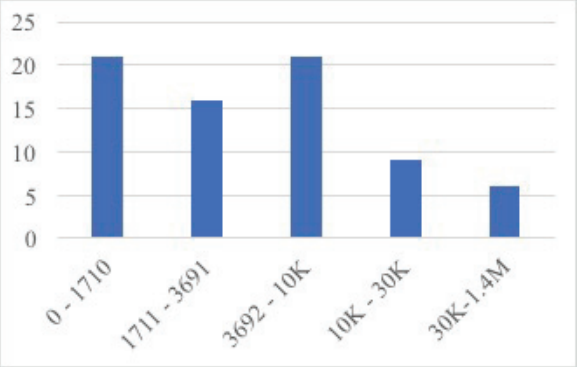

Figure 2. Frequency of accounts according to their follower numbers

5.1.2. Indirect network externalities. Twitter provides its users with extending indirect network externalities. An increasing number of consumers use Twitter in combination with other online services or

complementary services. In the case of advertisements, these services may be grouped as other SMS, e-commerce websites and services combining their value offerings with the Twitter service.

Among the SMS that were used were YouTube, Instagram and paper.li. Accounts shared their content in multiple channels. E-commerce websites were used for the sale of merchandise. For instance, in the second data set, more than 10% of the tweets were linked to products sold on Amazon. Amazon and eBay have affiliate marketing programs called Amazon Associates and eBay Partners, respectively. Members of these programs may earn money when their website visitors or social followers click their advertisement links and make purchases [48, 49]. Others posted advertisements for merchandise sold on websites such as mercado livre, FUT Fanatics and others.

In the second data set, more than 55% of the tweets linked to short domains that differed from Twitter's link service. Therefore, we may argue that short domains seem to be a common method to increase webpage click-through rates (i.e., the ratio of clicks per views an ad receives).

Finally, there was also an account with a subscription to SponsoredTweets. SponsoredTweets is a service that brings together brands and consumers; in this connection, brands tap into consumers' networks for advertisements, and consumers get compensated for publishing commercials [50].

5.2. Online identity

The analysis showed that online identity was used as a resource in two ways. In the first case, the presentation of identities concentrated on professional skills such as being a designer or photographer. Also, it emphasized expertise in specific topics like beauty, fashion, decoration, recipes, gardening and fitness. Accordingly, the advertisements posted by these profiles related to the specialization of the profile owner. Some examples of bios belonging to these profiles are as follows:

> *Wife & Mom. Creator & Photographer. Sharing fun and frugal decor, recipes and gardening. @eBay Influencer. Shop my designs: @society6 and @etsy.*
>
> *#TravelBlogger & #LifestyleBlogger | Aspiring Expat. Thrill Seeker. Animal Collector. Wanna be Chef. Follow along: https://t.co/SE1axfIijv*

In the second case, public personas (e.g., G20 leaders), entities (e.g., sports clubs) or hobbies (e.g., gaming) were utilized in the construction of the Twitter profile. They named the profile in the name of these public personas or entities and described the purpose of the profile in the bio as providing news or a fandom base. Some of them sold merchandise (e.g., posters, t-shirts) about these public identities or entities. Some examples of bios belonging to these profiles are as follows:

> *Los Angeles Lakers News*
>
> *Latest news from r/gaming. Posts may include Amazon Affiliate Links, use them for your next purchases at no additional cost:*
>
> *We post live news & updates about Taylor Swift, her appearances, events and concerts. Stay tuned for photos, videos, set lists, & more!*
>
> *#Collectibles About #NBA #Cleveland #Cavaliers #LeBronJames #Sports #Shopping #Bargains #Deals #eBay #Hot #Sales #Discount #Deal #Sporting #Basketball #LeBron*
>
> *Daily updates on everything Demi Lovato! Demi rt'ed 7/12/11 & 4/3/14 в™Ў Store: https://t.co/QKeCT1xqyI*
>
> *Latest Celebrity News, Celeb Gossip & Celebrities Stories. Get it all at http://t.co/DfSYnbolBy Watch videos with the latest celeb stories!!*

The reason these accounts exist could be that identities of public personas and entities as symbols or representatives of particular ideologies or lifestyles could be used as a networked resource due to their potential value for attracting attention.

6. Discussion

Shaped by the social and cultural habits of its users, SMS are sensitive to changing customs surrounding them [51]. What's more, they provide their users with various resources that may be utilized for different purposes. These include but are not limited to their interface features and social nature. In the case of Twitter, hashtags, retweets and mentions—which enable communication within itself and across other platforms—or its programming interfaces that are open for developers are examples of these resources.

SMS are prone to be adapted for different purposes due to their user-generated content, network of users and the resources available to these systems. Although they might have been designed for hedonic use, their feature set enables their adaption for utilitarian purposes. Or, as people become more affiliated with the social media service, hedonic motivations lose importance, and utilitarian purposes, which are enabled through existing or add-on features, gain prominence in their usage [10]. Previous studies mainly concentrated on their hedonic use and have found that social networking sites are used for utilitarian purposes of immediate access and coordination [10]; they have also found that direct network externalities, in terms of people already known, and indirect network externalities fortify both their utilitarian and hedonic value [36].

However, neither SMS' utilitarian use nor the resources that contribute to this type of adaption have been widely studied. The aim of this study was to uncover what resources were employed in the utilitarian use of SMS, more specifically for monetary gains through sponsored advertisements. The study was conducted by qualitatively analyzing tweets and the Twitter accounts posting them.

The findings of this study show that people use a variety of resources to earn money via SMS. Network externalities is the first type of resource that contributes to monetary gains on Twitter. Direct network externalities in the form of a high number of contacts is beneficial for increasing social media reach. The number of followers and/or followings of advertising accounts in the first data set was outside the average number of contacts (250 to 1710) identified by [35]. This implies that, in contrast to the findings of Lin and Lu's [36] study, unfamiliar people contribute to the utilitarian use of SMS.

In terms of indirect network externalities, three types of resources were observed in the case of Twitter: other SMS, e-commerce services and services combining their offering with the Twitter service. Profiles used Twitter together with other SMS such as Instagram, paper.li and YouTube. In addition, there were many accounts with a high number of posts with links to products sold on Amazon or eBay. Furthermore, SponsoredTweets was another service used for monetizing SMS by people.

The ability to present one's identity in desired ways was another type of prominent resource employed in the utilitarian use of Twitter. There were two kinds of identity presentation in this case. In the first case, the accounts presented themselves as specializing in certain topics such as fashion, decoration or cooking. In the second case, the profiles were constructed to provide news about a human or nonhuman entity (e.g., celebrities, sports clubs). In a way, providing news about these entities was the value offering of the account owner for his or her followers.

In line with the framework presented in Figure 1, the utilitarian use of Twitter is argued to be enabled by various resources. In the case of sponsored content, people utilize network externalities and online identity as operand resources to get utilitarian value from the Twitter service. In addition, their creativity, skills and knowledge played the role of operant resources by combining the offerings of the Twitter service with other complementary services and contextual resources. This way, they both determined and proposed value on Twitter. Table 5 displays example combinations of these resources in the case of utilitarian adaption of Twitter through sponsored content.

Table 5. Resources and utilitarian use

Resources	Example
Online Identity + Direct NE	Newsfeed about celebrities
Online Identity + Direct NE	Presentation of skills and knowledge
Indirect NE	Advertisements via SponsoredTweets
Online Identity + Direct NE + Indirect NE	Advertisements of merchandise about celebrities via eBay Partners

7. Conclusion

This research applies ST and SDL to explain utilitarian use of SMS. Previous literature investigated effects of utilitarian and hedonic motivations on user acceptance, and emphasized usability and functionality when it comes to the utilitarian value of IS. In this study, IS are seen as social systems that provide interaction settings for people to engage in reproduced relations and regular practices. These relations or practices that are hedonic or utilitarian in nature shape IS use through different applications of contextual resources. In addition, this study shows that resources external to IS may also contribute to their utilitarian value. In this sense, the combination of ST and SDL provides a new perspective for IS research and explains how IS may be adapted for different uses other than their design purposes. Another contribution of the study is that it shows that the combination of resources may result in different values for different people. Therefore, this approach is also practical for forecasting alternative uses of IS. Furthermore, a resource-based analysis of IS may foresee its possible uses. It may be possible to minimize the unprecedented consequences of IS use by deconstructing its resources to anticipate how the service may be utilized and how it may be combined with other resources in its context of use.

Yet, no study is without limitations. First, we see some limitations arise from the study's Twitter data analysis. In other words, we do not at this moment have, for example, interview-based data to support the findings. However, collected data are in essence user generated; therefore, it does compare to self-reported surveys or open-ended questionnaires. The applied methodology here followed guidelines given for qualitative analysis of social media data in IS research [52]. This also provides uniqueness to the study and may be presented as an example for the use of rich social media data in qualitative research in the IS field. A second limitation arises from the selection of the search words (i.e., advertisement and sponsored). We acknowledge that this narrows down the search results; for instance, advertisement tweets labeled with

"promotion" or non-labeled advertisements were not captured. However, the purpose of this study was not to cover all instances of sponsored tweets, but rather to illustrate the role of resources in utilitarian use of Twitter. We believe that studying posts with, for example, "promotion" would increase the variety and amount of resources that contribute to this kind of usage of the service. It should also be noted that we only analyzed Twitter use, and only for sponsored content, which limits the applicability of the findings to other SMS use and other IS use in general.

Future research may investigate different types of utilitarian uses of hedonic IS, such as the use of games for educational or health-care services. Otherwise, the reverse—hedonic adaption of utilitarian services—may be examined. For instance, crowdsourcing services are good candidates for this purpose. Other research may look into the impact of IS features on the hedonic or utilitarian use of IS. For instance, research may look into differences in feature-level use between utilitarian and hedonic adaptions.

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II

DUAL INFORMATION SYSTEMS: A REVIEW OF FACTORS AFFECTING THEIR USE

by

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Dual Information Systems: A Review Of Factors Affecting Their Use

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Abstract

More and more information systems (IS) are designed to address a blend of hedonic and utilitarian purposes, and hence become what information system scholars call today "dual systems." The aim of this research is chiefly to provide a holistic perspective for research done regarding dual IS (i.e., what factors affect users' adoption and post-adoption of these systems) in order to assess the state of knowledge in this area and to provide a reference point for system designers. To achieve this goal, we started out with a systematic literature review (35 articles), and analyzed the articles in terms of their theoretical background, constructs and findings. The results suggest that there is an increasing number of systems that are regarded as dual (e.g., gamified services, virtual worlds) and that the influential factors can be grouped according to the three dimensions of IS artefacts: information artefact, information technology artefact and social artefact.

Keywords

Dual Information Systems, Influential Factors, Hedonic, Utilitarian, Systematic Literature Review.

Introduction

The difference between IS according to their use purpose (e.g., hedonic vs utilitarian, work vs leisure) is increasingly becoming vague. The growing use of mobile services, the emergence of Web 2.0 and its corollary user generated content, and design strategies such as gamification have blurred the reasons why people engage with a system. Many IS that were designed for hedonic purposes are now used also for utilitarian reasons. For instance, Twitter is used as a newsfeed or a tool for political campaigns (Köse et al. 2016) and Facebook is used as a marketplace to buy and sell goods (Griffin 2016). On the other hand, gamification is used to enhance hedonic value of otherwise utilitarian services (Hamari and Koivisto 2015a) such as in the areas of crowdsourcing (e.g., (Melenhorst et al. 2015)) and education (e.g., (Domínguez et al. 2013)). Therefore, today many IS can be seen as dual systems that are used for both hedonic and utilitarian benefits according to the context of use or the task carried out (Gerow et al. 2013; Wu and Lu 2013).

However, previous research has not recognized this convergence when they in essence study dual IS. For instance, many previous studies viewed online social networks as hedonic only systems (e.g., (Gerow et al. 2013; Kefi et al. 2010; Sledgianowski and Kulviwat 2009; Wu and Lu 2013)) or focused only on their hedonic aspects (Xu et al. 2012). However, increasing number of studies show that they are also used for utilitarian purposes (e.g., (Köse et al. 2018; Xu et al. 2012)). Another example is games: They are seen solely as hedonic systems although they are now used for a variety of utilitarian purposes (e.g., serious games, simulation games) (Hamari and Keronen 2017). However, it is also easy to find studies that only recognize their utilitarian aspects because of their use contexts (e.g., (Bourgonjon et al. 2010; Hwang et al. 2013)). Those research with non-cognizance of dual systems might have studied the factors influential in adoption and post-adoption of these systems in a skewed manner. Therefore, they may overlook those aspects that may affect users' perception of these systems. In addition, designers and managers may lack a balanced view in the development and marketing processes of these technologies. Accordingly, our purpose in this study is to review which factors in the literature are observed to affect the use of dual systems.

To achieve this goal, we conducted a systematic literature review that covered acceptance and continued use of those systems that were overtly identified to serve dual purpose. In other words, we studied the research that recognized their subject system as dual, mixed, multi-purpose, convergent or serving both hedonic and utilitarian purposes. As a result of this review, we synthesized the factors we found into two testable models – one for adoption and the other for post-adoption of dual systems. Researchers may benefit from these models in identifying those concepts related to their research questions and make more informed decisions when including or excluding them in their empirical work. Practitioners, on the other hand, can develop their understanding with respect to design of these systems, and pay attention to the factors that were found to be influential at the design, development and marketing stages.

Methodology

We conducted a systematic literature review of the studies related to adoption and post-adoption of dual IS. We followed the guidelines provided by Webster and Watson (2002) and Boell and Cecez-Kecmanovic (2015). We used Scopus multidisciplinary database as our data source because it provides a comprehensive list of relevant articles. In addition, focusing only one database ensured that our protocol for literature selection is transparent, replicable and rigorous (Boell and Cecez-Kecmanovic 2015).

Our literature search was conducted in September 2018. We limited our search to the title-abstract-keyword in order to increase the number of relevant documents found. Our search string consisted of combinations and variations of terms that are reflective of duality (e.g., "dual information system", "utilitarian and hedonic"), adoption (e.g., "technology acceptance", "technology adoption") and post-adoption (e.g., "continuance", "discontinued use", "post-adoption"). These concepts are well established in the IS field; therefore, we did not limit our search to specific disciplines or outlets to reach as many documents as possible. The full version of the search string may be found in the appendix.

This search resulted in 94 documents. We screened these papers according to the following inclusion criteria: (1) The full paper can be reached, (2) The paper is a full research paper (conceptual and research-in-progress papers were excluded), (3) The subject information system of the research is explicitly recognized as a dual system (4) The paper analyses the effects of different factors on adoption or post-adoption of IS, (5) The paper is in English and was published in an international peer-reviewed outlet. As a result of this screening process 35 papers were included in this review.

The selected papers were analyzed according to the guidelines provided by Webster and Watson (2002). In other words, we studied their research model (e.g., dependent and independent variables), data analysis method (e.g., experiment, multi-group analysis) and theoretical basis to extract concepts that were influential on adoption or post-adoption of the subject system. For qualitative papers, we studied the findings of the papers to identify the influential factors.

Findings

The literature review showed that various types of technologies were self-proclaimedly studied as dual systems. Previous meta-analysis studies classified search engines, instant messaging, mobile Internet, Web use, personal computer, mobile devices, mobile services, email systems, short message services, online newspapers and blogs as dual IS (Gerow et al. 2013; Wu and Lu 2013). Our review showed that online shopping services (e.g., (Childers et al. 2001; Chiu et al. 2009; Lee et al. 2006)), mobile data (or Internet) services (e.g., (Deng et al. 2010; Wakefield and Whitten 2006; Yang and Lee 2010)), social networking services (e.g., (Chen and Fu 2018; Pillai and Mukherjee 2011)), gamified services (e.g., (Hamari and Koivisto 2015a)), virtual worlds (Barnes 2011; Liu et al. 2013; Zhou et al. 2014), mobile devices (Chun et al. 2012; Kulviwat et al. 2014; Wakefield and Whitten 2006), online multi-player games (Chang et al. 2014) and mobile museum guides (Pianesi et al. 2009) were proclaimed as dual systems. This result expands the types of systems that are acknowledged as dual in previous studies. To be more specific, it adds online shopping services, social networking services, gamified services, virtual worlds, online multi-player games and mobile museum guides to this group.

Majority of the studies investigated the phenomenon from the theoretical standpoint of technology acceptance model (TAM) (Davis 1989; Davis et al. 1992) especially related to the adoption of information systems. On the other hand, for the studies that investigated post-adoption, the theoretical approaches were

more varied but were still strongly connected to the established expectation-confirmation theory (ECT) literature (Bhattacherjee 2001; Bhattacherjee and Lin 2014). Therefore, we created two models to show the effects of the identified constructs based on these two theories. Figure 1 and Figure 2 present the resulting models in detail for TAM-based adoption and ECT-based post-adoption of dual IS respectively.

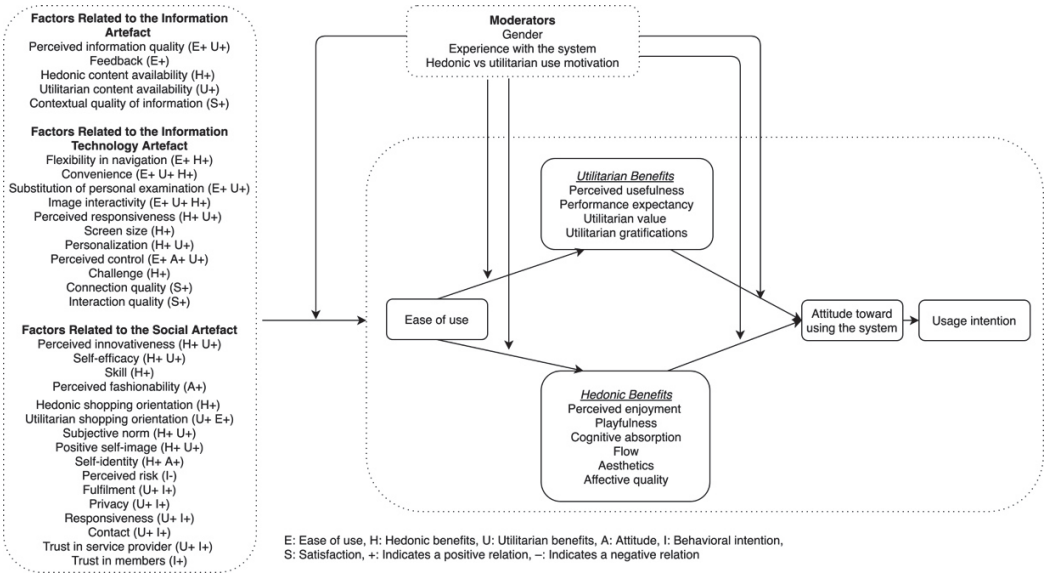

Figure 1. TAM-based model of factors affecting acceptance of dual IS

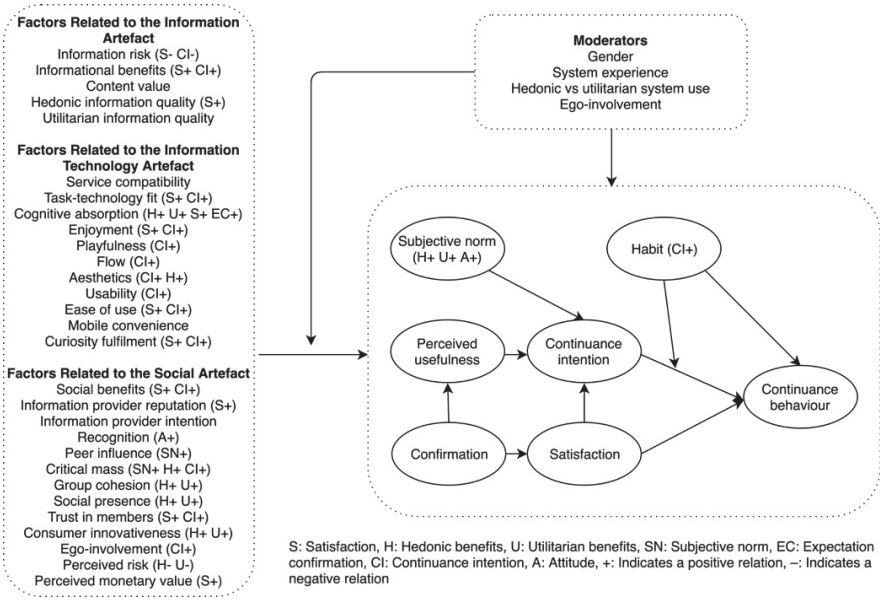

Figure 2. ECT-based model of factors affecting continued use of dual IS

The review showed that there was a wide variety of constructs that were investigated in the research models in addition to the core constructs of the given theoretical basis of TAM (i.e., the usefulness, ease of use, enjoyment, attitude and intention to use) and ECT (i.e., the usefulness, subjective norm, habit, satisfaction, confirmation and continued use intention). We grouped these extraneous constructs according to the three dimensions of IS artefacts (Iivari 2017): factors related to the information technology artifact, factors related to the information artifact and factors related to the social artifact. However, a complete taxonomical division of constructs is difficult to create because many of them are inter-related or cover overlapping concepts; yet, they differ in nuances. In these cases, we preferred to keep them as separate constructs in order not to lose any important aspects. Or, otherwise, they were named differently although

they represented the same concept. In these cases, we kept those constructs under the most common lexicon used in IS. In Figure 1 and 2, the factors that had a direct or indirect effect on the main variables of the two main theories are indicated with their effect in parentheses. However, it should be noted that the effect of all these antecedents is more complex in the original research models than in the respective research models presented in this paper. Moreover, in Figure 1, the hedonic and utilitarian benefits are shown in an aggregated manner to provide simplicity. In the reviewed literature, hedonic benefits were represented by perceived enjoyment, playfulness, cognitive absorption, flow, aesthetics and affective quality concepts. As for utilitarian benefits, they were represented by perceived usefulness, performance expectancy, utilitarian value or gratifications. The rest of the influential constructs and their effects are described in the following sections.

Factors Related to the Information Artefact

The importance of information quality as one of the major dimensions of IS success was pointed out more than 3 decades ago (DeLone and McLean 1992). With the emergence of Web 2.0 and its corollary user-generated content, this importance has only increased exponentially. Content is one of the major building blocks of social media services (Kietzmann et al. 2011), and it takes different forms in different types of systems. This prominence hasn't been overlooked with respect to dual systems neither. In the context of mobile information services, its inherent value and usefulness was found to positively affect satisfaction, particularly for users with hedonic motivation (Koivumaki et al. 2008). Also, its contextual quality such as its timeliness and relevance to users' context increased satisfaction (Koivumaki et al. 2008) and perceived ease of use and usefulness of the system; specifically, users with utilitarian goals perceived the system to be more useful when the information was relevant to their contexts (Wang et al. 2009). Furthermore, the type of content (i.e., hedonic content vs utilitarian content) (e.g., (Barelka et al. 2013; Dumlao and Ha 2013; Torres et al. 2014) was also put forward as content's important dimensions. Barelka et al. (2013) found that entertainment, informational and communication value of content affected usage of technologies particularly of those that benefited from user-generated content. For e-book readers, Torres et al. (2014) showed that hedonic and utilitarian content availability positively affected perceived playfulness and usefulness respectively. In the case of Twitter, Dumlao and Ha (2013) showed that hedonic information quality positively affected satisfaction with the system; but, utilitarian information quality increased perceived trust in members. Their study also indicated that information provider reputation and intention were influential factors for continued use of Twitter. Still, not only the content but also the feedback in the form of adequate and effective information about the internal states of the system - including those resulting from actions by the user, stands as an important factor because it influences perceived ease of use (Pianesi et al. 2009). Yet, users also hold concerns regarding how their information is used and shared by others in the network and the service provider. Hu, Kettinger and Poston (2015) showed that this kind of information risk negatively affected satisfaction with and continued use intention towards social networking services.

Factors Related to the Information Technology Artefact

A cognitive and aesthetic capture of users is becoming increasingly important with respect to interaction with IS. A captivating experience affects the enjoyment and usefulness driven from a system. Therefore, dual systems serving both hedonic and utilitarian benefits should balance this experience both with their interface characteristics and the utility they provide. The literature review showed that various interface and non-interface related aspects were studied with respect to dual systems. Among the interface related factors were flexibility in navigation, substitution of personal examination (Childers et al. 2001), image interactivity (Lee et al. 2006), perceived personalization (Pianesi et al. 2009), perceived innovativeness (Watchravesringkan et al. 2010) and interaction quality (Koivumaki et al. 2008) of the system. The non-interface related characteristics were perceived responsiveness (Chun et al. 2012), perceived ubiquitous connectivity (Chun et al. 2012), screen size (Kim and Sundar 2014) and connection quality (Koivumaki et al. 2008). All this research showed that these factors positively affected perceived ease of use, hedonic and utilitarian benefits and satisfaction with the system.

Also important here is the fit between user needs with the technology. Task-technology fit is about whether the technology characteristics meet users' needs. This fit positively affects continued use intention and satisfaction with the system (Lin 2016). A similar concept, service compatibility is the fit between users' needs and the "value-added" service; it positively affects perceived task-technology fit (Lin 2016).

Factors Related to the Social Artefact

Humans are social beings and the feeling of relatedness is one of their fundamental phycological needs that exhibits itself as the sense of belonging and being connected (Deci and Ryan 2000). This feeling is also valid in the context of information systems; e.g., through provision of social connections, cooperative and comparative actions (Przybylski et al. 2010). Similarly, the literature review pointed out social presence (Etemad-Sajadi 2014; Liu et al. 2013) and relational benefits (Chen and Fu 2018; Hu et al. 2015; Zhou et al. 2014) as influential factors. Social presence, which was defined as the ability to form warm and personal connections with people through the system, was found to positively affect hedonic and utilitarian benefits in the context of virtual worlds (Liu et al. 2013) and a restaurant website that made use of a virtual agent (Etemad-Sajadi 2014). On the other hand, relational benefits stand for communicative and social networking benefits. It was found that it positively affected satisfaction with the system and continued use intention in the context of social networking services (Chen and Fu 2018; Hu et al. 2015) and social virtual worlds (Zhou et al. 2014).

Another important social factor is subjective norm. It is the perceived social pressure from important others regarding performing or not performing the behavior (Ajzen 1991). It was found to positively affect hedonic and utilitarian benefits driven from the information system (Chun et al. 2012; Ozturk et al. 2016), attitude towards using it (Hamari and Koivisto 2015a) and continued use intention (Chang et al. 2014).

In addition, the number of other users also enhances the value a user drives from a system (Katz and Shapiro 1994). Chang et al. (2014) conceptualized this as critical mass and defined it as the existence of substantial number of people using the technology. In the context of online multiplayer games, they found that it positively affected subjective norm, hedonic expectations and continued use intention.

According to Hamari and Koivisto (2015b), Lott and Lott (1965) and McCauley (1989) state that recognition may enhance group cohesion by providing a sense of acceptance, and hence increase the appeal of the group or of the group members. The literature review pointed out close concepts: positive self-image, recognition and group cohesion. Positive self-image is about the status or standing within a group. Chun et al. (2012) showed that positive self-image positively affected Korean college students' perceived enjoyment and usefulness with smartphones. Recognition, defined as the social feedback received with regards to behaviors, was shown to positively affect attitude in the context of a gamified exercise service (Hamari and Koivisto 2015a). Group cohesion, on the other hand, is the sense of belonging to a particular group: Liu et al. (2013) showed that it positively affected hedonic and utilitarian benefits in the context of the virtual world, Second Life. In addition, perceived fashionability was also put forward as an important aspect in the context of smartphones (Watchravesringkan et al. 2010). When the product/service was adopted by relatively high number of people and its certain attributes implied popularity, users perceived it as fashionable and this perception positively affected their attitude towards using the smartphone (Watchravesringkan et al. 2010).

Monetary transactions or provision of personal information is part of many dual systems such as online shopping services, hotel booking services, smartphone applications and virtual communities. A rich body of literature studied user concerns stemming from these kind of activities (e.g., (Hui et al. 2014; Malhotra et al. 2004)). Accordingly, our review showed that user concerns related to trust and perceived risk played significant roles in dual systems' use. Trust is the belief in the ability, benevolence, and integrity of the other parties involved in an activity. It was studied in the context of online shopping services (Chiu et al. 2009), virtual communities (Lee et al. 2014) and social networking services (Dumlao and Ha 2013). These studies showed that trust positively affected intention to use and continued use intention towards the subject information system. In addition, Chiu et al. (2009) showed that fulfilment, privacy, responsiveness and contact were significant antecedents of trust in the context of online shopping. He defined fulfilment as the degree to which the service accomplished its promise to the customers; privacy as the degree to which customer information was kept secure and protected; responsiveness as adequate and timely handling of problems and questions; and contact as availability of assistance through service representatives. What is more, Dumlao and Ha (2013) showed that utilitarian information quality and information provider intention also had a positive effect on perceived trust in the context of the social networking service, Twitter. They defined utilitarian information quality as the quality of the information piece to provide knowledge to users, or enable them to achieve a task or objective; and information provider intention as the altruistic and responsible behaviour of the information provider towards other users.

On the other hand, perceived risk was conceptualized as the concerns regarding possible losses (e.g., related to security, privacy or money) when a product did not perform as expected. It was studied comparatively for hedonic and utilitarian smartphone applications (Xiang et al. 2015) and in the context of mobile hotel booking services (Ozturk et al. 2016). These studies showed that perceived risk negatively affected intention to use and continued use intention. Yet, these affects were stronger for utilitarian systems (Xiang et al. 2015). Besides, it was found that perceived risk's negative effect was stronger on hedonic benefits than on utilitarian benefits (Ozturk et al. 2016).

The literature review also showed that various characteristics of users influenced their use of dual IS. Among these are demographic characteristics, personalities, skills and their motivation towards the IS use. Gender significantly affects the influence of various factors. For instance, several studies found that the effects of social, hedonic and utilitarian benefits differed between genders with respect to acceptance (Yang and Lee 2010) and continued use intentions (Chen and Fu 2018; Zhou et al. 2014).

Users' personalities were studied from various perspectives. For example, self-identity, which was defined as the conformity of the technology to the user's own enduring values and attitudes as a part of their societal role, was found to positively affect enjoyment and attitude with respect to travel related mobile applications (Young Im and Hancer 2014). Notably, experience with the technology decreased this positive effect on enjoyment; yet, it enhanced the positive effect on attitude. A close concept to self-identity was ego involvement. Sánchez-Franco and Martín-Velicia (2011) found that ego involvement positively affected commitment (in other words continued use intention), and it interacted with the effects of aesthetics and usability differently in hedonic and utilitarian websites. Another studied personality characteristics was consumer innovativeness. Ozturk et al. (2016) defined consumer innovativeness as the degree to which an individual was receptive to new ideas and made innovative decisions independently, and was willing to try out new technologies. Their study found that it positively affected utilitarian value more than hedonic, and it had an indirect positive effect on continued use intention.

Skill is another user related factor that was shown to be influential. Pianesi et al. (2009) defined it as the user's capacity for pursuing a given activity (e.g., using the system). Their study showed that in the context of adaptive mobile museum guides, skill positively affected cognitive absorption experienced with the system.

When the subject technology serves dual purposes, users may approach these systems with differing motivations. They may have a hedonic orientation and tend to seek experiential value (e.g., enjoyment) from the activity, or they may be utility-oriented and tend to seek instrumentality (e.g., time saving) from it. Lee et al. (2006) studied user motivation in the context of online shopping and found that hedonic shopping orientation positively affected enjoyment; and utilitarian shopping orientation positively affected perceived ease of use and usefulness.

Furthermore, temporal and economic factors also play an important role in adoption and continued use of dual systems. Among the temporal aspects are past experience with the technology and frequency of prior use. Past experience is previous contact with or exposure to an information system, in other words, its earlier use. In a longitudinal study with e-health newsletters, Forquer, Christensen and Tan (2014) showed that it is a stronger predictor of future use than intention. Their study also showed that perceptions of utility remained stable over time (i.e., as the experience increased) (Forquer et al. 2014). However, experience with the system has a negative effect on perceived hedonic benefits: They lose their positive effect on use intentions with experience (Barnes 2011; Forquer et al. 2014). Frequency of prior use is also an important temporal factor that causes habitual use, which positively affects continued use intention (Barnes 2011). Economic factors were represented as perceived monetary value: It is the fee of using an information system (e.g., mobile application), and it was found to positively affect satisfaction with smartphone applications in the post-adoption stage (Choi 2017).

Conclusion

This paper studied the systems that were proclaimed to be multi-purpose and those concepts that were influential on their adoption and post-adoption. Through a systematic literature review, in total 35 articles were analysed with respect to their theoretical bases, research models and data analysis methods. The purpose of this review was to provide an overview of the state-of-knowledge regarding dual systems and those factors that were influential on their use. We grouped the factors we found according to the three

dimensions of IS artefacts; yet, we acknowledge that this grouping is not strict and the concepts may belong to more than one dimension. The results of this overview were synthesized into two models presented in Figure 1 and Figure 2.

The review showed that dual systems comprise more types of technologies than regarded by previous literature (e.g., (Gerow et al. 2013; Wu and Lu 2013)). The systems that were proclaimed to be multi-purpose in the review were online shopping services, virtual worlds, gamified systems, mobile devices (e.g., smart phones, tablets, e-book readers), mobile travelling services, social networking services, Internet services, online multi-player games and mobile museum guides. This result emphasizes that a unilateral perspective would be biased when designing or studying these systems, and it highlights the importance of breaking preconceptions about what makes people use a system, and the factors influential on its use.

The results of this study provide a comprehensive review of factors influential on adoption and post-adoption of dual IS. Therefore, system designers can benefit from it in identifying the factors that influence consumer perception of a multi-purpose technology in design, development and marketing stages of the system. However, designers should pay heed to the factors that are prominent for specific systems because not all factors are generalizable to other systems or use types.

As an early overview and front end of a bigger study, this research has some limitations that provide avenues for future research. First, there are limitations due to the search string used. The search string focused on adoption, post-adoption and duality in information systems. Yet, there are studies in other areas that can provide important insights about multi-purpose systems and factors affecting their use. Therefore, future research should expand the review to cover other areas using a richer set of keywords in the search string. Second, the literature review covers only those papers that explicitly recognize dual systems. Therefore, future research can expand this review to cover the articles that analyze dual systems without a claim of their multipurpose use. Finally, we were not able to apply the concepts developed in Figure 1 and 2 to different dual IS and to test the influences exemplarily, nor we were able to provide a thorough reflection of the effects of the constructs (e.g., their strength). Therefore, these steps remain as future work. Another step towards improving this work would be to provide design implications regarding the factors influential on the use of a given system or testable propositions with regards to their effects.

Appendix

(TITLE-ABS-KEY ("dual information system") OR TITLE-ABS-KEY ("mixed information system") OR TITLE-ABS-KEY ("utilitarian/hedonic") OR TITLE-ABS-KEY ("hedonic/utilitarian") OR TITLE-ABS-KEY ("hedonic and utilitarian") OR TITLE-ABS-KEY ("hedonic or utilitarian") OR TITLE-ABS-KEY ("utilitarian and hedonic") OR TITLE-ABS-KEY ("utilitarian or hedonic") OR TITLE-ABS-KEY ("dual-purposed")) AND (TITLE-ABS-KEY ("technology acceptance") OR TITLE-ABS-KEY ("technology adoption") OR TITLE-ABS-KEY ("continued use") OR TITLE-ABS-KEY ("continuance") OR TITLE-ABS-KEY ("continue using") OR TITLE-ABS-KEY ("discontinuance") OR TITLE-ABS-KEY ("discontinued use") OR TITLE-ABS-KEY ("discontinue using") OR TITLE-ABS-KEY ("post-adoption")) AND (LIMIT-TO (DOCTYPE,"ar ") OR LIMIT-TO (DOCTYPE," cr ") OR LIMIT-TO (DOCTYPE," cp ") OR LIMIT-TO (DOCTYPE," ch "))

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III

IS IT A TOOL OR A TOY? HOW USER'S CONCEPTION OF A SYSTEM'S PURPOSE AFFECTS THEIR EXPERIENCE AND USE

by

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Is it a tool or a toy? How user's conception of a system's purpose affects their experience and use

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ABSTRACT

The boundary between hedonic and utilitarian information systems has become increasingly blurred during recent years due to the rise of developments such as *gamification*. Therefore, users may perceive the purpose of the same system differently, ranging from pure utility to pure play. However, in literature that addresses why people adopt and use information systems, the relationship between the users conception of the purpose of the system, and their experience and use of it has not yet been investigated. Therefore, in this study we investigate the interaction effects between users' utility-fun conceptions of the system and the perceived enjoyment and usefulness from its use, on their post-adoption intentions (continued use, discontinued use, and contribution). We employ survey data collected among users (N = 562) of a gamified crowdsourcing application that represents a system affording both utility and leisure use potential. The results show that the more fun-oriented users conceive the system to be, the more enjoyment affects continued and discontinued use intentions, and the less ease of use affects the continued use intention. Therefore, users' conceptions of the system prove to be an influential aspect of system use and should particularly be considered when designing modern multi-purposed systems such as gamified information systems.

1. Introduction

Information system (IS) designers increasingly attempt to enhance the engagement and immersiveness of their systems by enriching them with game design. This novel development is known as *gamification* (Huotari & Hamari, 2017; Koivisto & Hamari, 2019; Liu, Santhanam, & Webster, 2016; Morschheuser, Hassan, Werder, & Hamari, 2017; Vesa, Hamari, Harviainen, & Warmelink, 2017). The rationale behind gamification stems from the notion that games are an acme of hedonic system design and are able to arouse autotelic, self-purposeful and highly motivated behaviors (Huotari & Hamari, 2017; Malone, 1981; Ryan, Rigby, & Przybylski, 2006). Therefore, it is believed that the successful transfer of such designs may also evoke benefits in the context of utilitarian ISs. Several studies have revealed that the enrichment of utilitarian ISs with additional hedonic benefits through gamification can have positive effects on users' intrinsic motivations and behaviors (Eickhoff, Harris, de Vries, & Srinivasan, 2012; Hamari, 2013, 2017; Koivisto & Hamari, 2019; Jung, Schneider, & Valacich, 2010; Morschheuser, Hamari, Koivisto, & Maedche, 2017; Seaborn & Fels, 2015; Thom, Millen, & DiMicco, 2012; Xi & Hamari, 2019). Gamification has thus become a growing trend in IS design (Koivisto & Hamari, 2019), and since gamified ISs converge *hedonic* and *utilitarian* purposes (Hamari & Koivisto, 2015; Liu et al., 2016), such systems may also be perceived differently in the user's mind (Chesney, 2006; Wu & Lu, 2013). This duality of gamified systems enables them to be used purely as a game for enjoyment, as a tool for more serious benefit, or as both to varying degrees. Therefore, an interesting research gap exists in understanding the post-adoption of these systems that can be regarded either as games or tools.

Users may conceive gamified systems to have been primarily designed as either a useful instrument or as a game (i.e. a self-purposeful hedonic system designed merely for leisure pursuits). Deterding, Dixon, Khaled, and Nacke (2011) also confirm the flexibility of gamified systems for situational interpretations as falling between instrumental and gameful. Moreover, differential use cases have also been discussed in previous studies on different types of dual systems (e.g., Köse, Semenov, & Tuunanen, 2018; Xu, Ryan, Prybutok, & Wen, 2012). Therefore, in this study we define a construct that we call the "*user's conception of the*

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instrumental-hedonic purpose of the system". Specifically, it refers to a user's conception or classification of the purpose of a system on an instrumentality-leisure continuum that is separate from the lived-experience of how much usefulness or enjoyment the user might actually derive from the use of the system. For example, a user may conceive an activity tracker as being a highly instrumentally-purposed system, but they might derive higher enjoyment from its use than practical utility. In essence, the user's conception may further affect the users' experience with the system because it forms the base for their expectations and may set their initial motivation for using the system.

The user's conception of a system along a utility-fun continuum therefore presents an important antecedent of user intentions in dual ISs, particularly in gamified dual ISs where gamification elements must match the user characteristics (Liu et al., 2016). This is because the person that views the system as being fun-oriented may abandon its use for a lack of enjoyment in his/her engagement; and, in comparison, it is also possible that the hedonic aspects of an IS may distract the user who views the system as being utility-oriented and prefers a leaner design. Hence, we study both continued and discontinued post-adoption use intentions with regards to user conceptions of the system, because users' experiences along with their expectations of the system may significantly influence their decision making in regard to their future use. In addition, gamification has been identified to be particularly useful for deriving and sustaining user-generated content (Cavusoglu, Li, & Huang, 2015; Morschheuser, Hamari, et al., 2017; Morschheuser, Hamari, & Maedche, 2019). Particularly, crowdsourcing systems utilize the Internet to reach and coordinate large groups of people (the crowd) and involve them in distributed problem-solving (Doan, Ramakrishnan, & Halevy, 2011; Estellés-Arolas & González-Ladrón-de-Guevara, 2012; Kaufmann, Schulze, & Veit, 2011; Morschheuser, Hamari, et al., 2017). Therefore, the success of these systems depends on a reserve of people that are motivated to contribute. For these reasons, contribution intention also stands as an important post-adoption aspect for systems where input from users is necessary.

In the scope of this research, we investigate how users' conceptions of the system interact with the relationship between antecedents of use intentions (namely, perceived enjoyment, usefulness and ease of use), and post-adoption related intentions of continued use, discontinued use, and contribution. To this end, our research questions are: 1) How does the user's conception of a system on an instrumentality-leisure continuum moderate the effects of enjoyment, usefulness and ease of use on the post-adoption intentions of continued use, discontinued use and contribution?: 2) In light of the user's conception, how do enjoyment, usefulness and ease of use influence these post-adoption intentions? We investigate these research questions by way of a psychometric survey adapted to a *gamified crowdsourcing app*. The user conception of the system is measured using a self-developed semantic scale, and the remainder of the survey questions are adopted from previous research. Partial least squares structural equation modeling (PLS-SEM) has been used to estimate the research model and to test hypotheses. The data collected from 562 users of the gamified application revealed that user conception significantly interacted with the users' experience of the system in regard to its effect on continued and discontinued use intentions. These results draw attention to a user's conception of the purpose of a system as forming an important antecedent of use intention in the context of gamified systems. This finding indicates the importance of targeting users in the design of gamified systems. In addition, the study shows that perceived enjoyment is a more prominent factor than perceived usefulness with respect to discontinued use intention in the context of gamified systems. These results can also offer potential insights for other types of dual ISs.

The remainder of this paper is organized into 5 sections. Section 2 provides the theoretical background: It starts with hedonic and utilitarian ISs, introduces the construct of user conception, and elaborates on post-adoption use intentions. In addition, it develops the research model together with the presented hypotheses. Section 3 describes the subject of gamified technology, the study data and the study methods. Section 4 presents the results of the study. In Section 5, theoretical and managerial implications, limitations, and directions for future research are discussed. The paper conclusions are presented in Section 6.

2. Theoretical background

2.1. Hedonic and utilitarian information systems

According to Hirschman and Holbrook (1982), hedonic benefits refer to the experiential characteristics of a service that evoke psychological aspects of the usage process by appealing to the emotive, multisensory and imaginative side of the consumer experience. They state that it may cause historic imagery through sensory reminders i.e., multisensory images that stem from past events, or may lead to the construction of fantasy imagery. Moreover, Hirschman and Holbrook (1982) render that hedonic value may involve social aspects of the consumer experience. Therefore the hedonic value may be more about what a service represents, rather than what it actually is. Babin, Darden, and Griffin (1994) claim that hedonic activity may become an end in itself, and may serve therapeutic needs by elevating the mood resulting in spontaneous and immediate responses. As such, hedonic activity is subjective and difficult to measure (Hirschman & Holbrook, 1982; Tractinsky, Katz, & Ikar, 2000).

In turn, utilitarian benefits represent the intended outcomes of conscious pursuits; hence, the activity is not an end in itself (Babin et al., 1994). Consumers with a utilitarian orientation are rational, and focus on tasks and accomplishments (Sherry, 1990). However, unlike hedonic activity, utilitarian value is quantifiable in terms of objective measures and sets efficiency and user performance as the most important goals (Tractinsky et al., 2000).

Similarly, users derive hedonic and utilitarian benefits from ISs as well (Gerow, Ayyagari, Thatcher, & Roth, 2013; Kim & Han, 2011; van der Heijden, 2004; Venkatesh & Brown, 2001). According to their design purpose and/or consumers' motivations to use them, ISs may be classified as hedonic, utilitarian and dual systems (Chesney, 2006; Gerow et al., 2013; Sun & Zhang, 2006; Wu & Lu, 2013). van der Heijden (2004) distinguishes hedonic ISs as pleasure oriented systems related to leisure and home activities designed for prolonged use without any external aim. In contrast, utilitarian ISs have a task-oriented nature and are mostly developed for business contexts. The value they provide is external to the user-system interaction and lies in its instrumentality and the ability to increase task performance and efficiency (van der Heijden, 2004).

Generally, dual information systems refer to those systems that may be used for both utilitarian and hedonic reasons either depending on the context of the use (Sun & Zhang, 2006) or the nature of the task (Chesney, 2006). They combine features from hedonic and utilitarian systems (Gerow et al., 2013). Although theoretically not fully cultivated, the duality of information systems and services is not an entirely new idea, and for close to four decades the role of computers in combining both work and play has been recognized. Video games (Malone, 1981) and metaphors (Carroll & Thomas, 1982) are the initial sources of inspiration for mixing fun and utility in this context, and this approach has been represented in different ways such as funology, ludic design, games with a purpose, serious games, and pervasive games (Deterding et al., 2011).

Likewise, gamified ISs are a growing type of dual IS that aim to improve user experience and engagement by converging hedonic and utilitarian benefits (Hamari & Koivisto, 2015; Köse & Hamari, 2019; Liu et al., 2016). Gamification refers to design that attempt to evoke similar positive experiences as games, such as enjoyment, immersion, flow etc. (Huotari & Hamari, 2017; Vesa et al., 2017). This is commonly pursued by transforming systems and services to be more game-like by taking inspiration from games (Deterding, 2015; Huotari & Hamari, 2017). Deterding et al. (2011, p. 10) define gamification as "the use of game

design elements in non-game contexts", therefore they differentiate gamification from close concepts such as serious games, games with a purpose, or pervasive games in a partial or whole dimension. However, Huotari and Hamari (2017, p. 25) take a service marketing point of view and define gamification as " a process of enhancing a service with affordances for gameful experiences in order to support users' overall value creation." This view brings together the concepts such as serious games, games with a purpose or pervasive games under the umbrella of gamification by forwarding the user experience as the defining element. The ultimate goal of gamification is to increase the instrumentality of systems and services through motivating and engaging user experience (Hamari & Koivisto, 2015; Suh, Cheung, Ahuja, & Wagner, 2017). Examples of gamified systems include enterprise software (Morschheuser, Henzi, & Alt, 2015; Schacht & Maedche, 2015; Thom et al., 2012), e-commerce websites (Hamari, 2017; Harwood & Garry, 2015), crowdsourcing systems (Melenhorst, Novak, Micheel, Larson, & Boeckle, 2015; Morschheuser, Koivisto et al., 2017; Morschheuser et al., 2019), innovation management (Morschheuser, Maedche, & Walter, 2017; Scheiner, 2015), and ISs used in education (Bonde et al., 2014; Domínguez et al., 2013).

Previous research on dual systems has mainly focused on four streams. The first stream concentrated on the acceptance of dual ISs from various theoretical perspectives with an evident dominance of the technology acceptance model (TAM) (Davis, Bagozzi, & Warshaw, 1992; Davis, 1989; Davis, Bagozzi, & Warshaw, 1989). The analyzed ISs included, but were not limited to, online shopping services (e.g. Childers, Carr, Peck, & Carson, 2001; Lee, Fiore, & Kim, 2006), mobile data or Internet services (e.g. Wakefield & Whitten, 2006; Yang & Lee, 2010), social networking services (e.g. Cocosila & Igonor, 2015; Pillai & Mukherjee, 2011), gamified services (e.g. Adukaite, van Zyl, Er, & Cantoni, 2017; Herzig, Strahringer, & Ameling, 2012; Rodrigues, Oliveira, & Costa, 2016), and serious games (e.g. Laumer, Eckhardt, & Weitzel, 2012; Martínez-Pernía et al., 2017; Yusoff, Crowder, & Gilbert, 2010). The second stream studied the continued use intentions for these ISs through the use of TAM (e.g. Hamari & Koivisto, 2015; Xu, Lin, & Chan, 2012) and expectation confirmation theory (ECT: Bhattacherjee, 2001) (e.g. Deng, Turner, Gehling, & Prince, 2010; Hsu, Lin, & Tsai, 2014). Overall, these studies show that utilitarian benefits have a consistent positive effect on continued use intention (e.g. Barnes, 2011; Chang, Liu, & Chen, 2014; Deng et al., 2010; Hamari & Koivisto, 2015; Kim & Oh, 2011; Ozturk, Nusair, Okumus, & Hua, 2016; Zhou, Jin, & Fang, 2014), however, the influence of hedonic benefits on continued use intention has been seen to vary from negative (e.g. Deng et al., 2010) to positive (e.g. Barnes, 2011; Chang et al., 2014; Hamari & Koivisto, 2015; Kim & Oh, 2011; Ozturk et al., 2016; Zhou et al., 2014). The third stream conducted meta-analyses to study the comparative effects of intrinsic and extrinsic motivation on use intention and actual usage across system types (Gerow et al., 2013; Wu & Lu, 2013), and how system type moderated the effect of particular antecedents (e.g. enjoyment, playfulness, usefulness) on system acceptance in the context of self-service technologies (Blut, Wang, & Schoefer, 2016). The fourth stream compared how the explanatory power of different antecedents changed between utilitarian and hedonic uses of the system (e.g. Childers et al., 2001; Lee, Ahn, Kim, & Lee, 2014; Oh & Yoon, 2014; Sánchez-Franco & Martín-Velicia, 2011; Wakefield & Whitten, 2006; Wang, Chou, & Chang, 2009; Xiang, Jing, Lee, & Choi, 2015). These studies show that enjoyment and usefulness have varying influence on attitude, intention to use and continued use intention, according to the utilitarian vs hedonic nature of the task and the hedonic vs utilitarian design of the system. For instance, Childers et al. (2001) showed that in the more utilitarian context of grocery shopping, usefulness and enjoyment have respectively stronger and weaker influences on attitude. Wakefield and Whitten (2006) compared the effects of cognitive absorption and playfulness on perceived usefulness, ease of use, enjoyment and intentions between Blackberry PDAs with functional and hedonic specifications. Their study found that the orientation of the Blackberry PDA had a significant effect on usefulness, but not on enjoyment or intentions. They also showed that the perceived playfulness of the interaction with the PDA positively affected perceived enjoyment, usefulness and intention to use the device; and that enjoyment and intentions were highest when the product was hedonically oriented and users perceived it to be playful. Other studies have compared the effects of different antecedents such as information quality (Koivumaki, Ristola, & Kesti, 2008), ego-involvement (Sánchez-Franco & Martín-Velicia, 2011), trust (Lee et al., 2014) between hedonic and utilitarian use. However, despite various perspectives being taken to analyze dual ISs, the interaction of the user's conception of the system with hedonic and utilitarian antecedents and different post-adoption intentions remains unexplored.

2.2. User conceptions of the information system

Traditionally ISs have been classified as utilitarian or hedonic, irrespective of its users. However, the proliferation of dual ISs (e.g. through the gamification of essentially utilitarian systems) emphasizes the position of users as determiners of the type of these systems. In a dual IS, users can derive both enjoyment and utility from use of the system. In some cases hedonic benefits surpass, and in others utilitarian (van der Heijden, 2004). This is particularly true for gamified systems with their openness for situational interpretations of being gameful or instrumental by their users (Deterding et al., 2011).

While individuals all have their particular views and tastes, their underlying conceptions of an IS may range between hedonic and utilitarian. In other words, some may see the hedonic aspects of a dual system, while others may enunciate utilitarian facets. We define the user's conception as the implicit classification that people attribute to a system, according to how they view and use it. In this respect, people may view a dual system within a spectrum of fun and utility. Therefore, the user conception is a continuum with hedonic and utilitarian classifications at either end. The *utilitarian classification* refers to the users' perspective that the system is a task-focused technology that is used to efficiently complete an undertaking, and the *hedonic classification* is the perspective that the system is a leisure-oriented technology that is used for pleasure, experiential satisfaction and without external pursuits. Yet, the indicator of this conception may move, depending on various factors. As an additional factor, an individual may have a hedonic view towards only those IS related activities that are inherently interesting to him/her, and on the other hand, people may start enjoying activities that are in essence pursued for utility when, for instance, their psychological needs for relatedness, autonomy and competence are answered (Ryan & Deci, 2000).

For these reasons, ISs are not perceived or used solely according to the designers' intentions, and people can attribute different meanings to the same system according to their own interests, experiences or contexts (Köse et al., 2018). Depending on these attributions (i.e. how they view the system), people can use the system with different motivations. As stated before, a hedonic use purpose can only be activated when the user is interested in using the system, whereas a utilitarian motivation is triggered by a salience of factors such as external rewards, punishments, approval from others, or ego involvement (Ryan & Deci, 2000).

Moreover, Babin et al. (1994) state that user mentality towards an activity may inhibit or distract one type of value in the face of another. That is, hedonic benefits may color utilitarian benefits and vice versa. Also, the emotive side of experience is more easily accessible and with shorter response times than utilitarian evaluations. However, when hedonic and utilitarian benefits hold ambivalence, the emotive side gains prominence (Ajzen & Fishbein, 2000). Ryan and Deci (2000) explain this eloquently:

A person might originally get exposed to an activity because of an external regulation (e.g., a reward), and (if the reward is not perceived as too controlling) such exposure might allow the person to experience the activity's intrinsically interesting properties, resulting in an orientation shift. (p. 63)

Several studies in the retail field have shown that shoppers' hedonic-utilitarian orientations have a moderating effect on their behavioral intentions such as shopping and re-visits (e.g. Kaltcheva & Weitz, 2006; Wang, Minor, & Wei, 2011). Also, in the context of online retailing, it has been shown that a utilitarian shopping orientation positively affected perceived usefulness, and a hedonic shopping orientation positively influenced perceived enjoyment (Lee et al., 2006). Also, studies on mobile services have shown that users' hedonic or utilitarian behavioral goals influenced the importance of information quality dimensions regarding their effect on user satisfaction (Chae, Kim, Kim, & Ryu, 2002; Koivumaki et al., 2008). Therefore, as an antecedent of orientation and motivation, the user's conception of the system might have similar interactions with user experience within a dual system.

2.3. Post-adoption intentions

For gamified dual ISs where user-generated content is important (e.g. crowdsourcing systems), three types of post-adoption intention stand out: continued use, discontinued use and contribution. However, the user's conception of the system may affect these intentions differently. Previous research has shown the benefits of gamification for continued use intention (e.g. Hamari & Koivisto, 2015; Suh et al., 2017) and user behavior (e.g. Hamari, 2017), the influence of hedonic and utilitarian determinants on use intent towards dual systems (e.g. Gerow et al., 2013; Wu & Lu, 2013) and continued use intention (e.g. Chiu & Wang, 2008; Lin, Wu, & Tsai, 2005). Yet, discontinued use intention remains unstudied. This is an important perspective, as despite having utilitarian and hedonic benefit, the influence of gamification may be short-lived due to e.g. a fading of novelty (Koivisto & Hamari, 2014; Suh et al., 2017), and users may subsequently abandon using the system. Therefore, for the long-run viability and success of dual ISs, it is necessary to know how hedonic and utilitarian benefits influence different post adoption intentions when combined with the user's conception of the system.

Continued use intention is the mental predisposition about continuing to use an information system over a long-term period after its initial acceptance (Bhattacherjee, 2001). Discontinued use intention, on the other hand, is defined as being the intention to abandon a given information system. Continued use intention and discontinued use intention have been assumed to be two ends of the same continuum (Turel, 2015). However, multiple attitudes toward a psychological object may coexist implicitly or explicitly, or they may surface contextually (Ajzen, 2001). Increasing research on discontinued use intention shows that it has different antecedents compared to continued use intention (Turel, 2015). Therefore, a discontinued use intention may be caused by different IS dependent variants. For instance, the hedonic use of social networking services has been seen to be discontinued in cases of social overload (Maier, Laumer, Weinert, & Weitzel, 2015) or guilt feelings due to e.g. time spent on the service (Turel, 2015). Dissatisfaction arising due to an expectation-reality gap for example as a result of underutilization (Bhattacherjee, 2001) or an incompatibility with needs (Tully, 2015) have been some of the other reasons found for discontinuation of ISs.

The third behavior type user contribution has become an essential component of many ISs and their value offering as a progeny of Web 2.0. For instance, one of the functional building blocks of social media services is identified as shared content that may consist of texts, pictures, videos, links etc. (Kietzmann, Hermkens, McCarthy, & Silvestre, 2011). In the context of crowdsourcing services, user contribution is seen as the essence of the system, and the collaborated work may be classified variously as *crowdprocessing*, *crowdsolving*, *crowdrating* and *crowdcreating* (Morschheuser, Koivisto et al., 2017). Yet, the factors affecting contribution intention vary. Previous research on electronic knowledge repositories, online communities and various other social media sites has shown that a combination of intrinsic and extrinsic benefits drive user contribution (e.g. Kankanhalli, Tan, & Wei, 2005; Nov, 2007; Tang, Gu, & Whinston, 2012; Wasko & Faraj, 2005). For example, reputation (Tang et al., 2012; Wasko & Faraj, 2005), organizational rewards (Kankanhalli et al., 2005), desire for exposure (Tang et al., 2012), and revenue sharing (Tang et al., 2012) are among the extrinsic motivations that drive user contribution; and enjoyment (Nov, 2007), enjoyment in helping others (Kankanhalli et al., 2005), and knowledge self-efficacy (Kankanhalli et al., 2005) are aspects that intrinsically motivate user contribution. Moreover, the gamification of crowdsourcing systems has been found to have positive effects on contribution intention both quantitatively (e.g. Eickhoff et al., 2012; Lee et al., 2013) and qualitatively (e.g. Eickhoff et al., 2012; Prestopnik & Tang, 2015).

2.4. Research model and hypotheses

This research studies the relationship between hedonic and utilitarian benefits, user conception of the system, and post-adoption intentions in a gamified dual IS. The theoretical model is a revision of van der Heijdenös (2004) technology acceptance model that is used to reflect the interaction effects between a user's conception of a system and their perceived benefits of its use on their behavioral intentions in the post-adoption stage. Previous research has operationalized hedonic benefits in different ways including perceived enjoyment, playfulness, cognitive absorption and flow experience (Gerow et al., 2013). Most commonly, hedonic benefits have been operationalized as perceived enjoyment (Gerow et al., 2013), and utilitarian benefits with perceived usefulness, which is the most important measure of benefit for utilitarian ISs (e.g. Wu & Lu, 2013). Therefore, as antecedents of post-adoption intentions, the model includes perceived ease of use (EoU), and hedonic and utilitarian benefits that were operationalized with perceived enjoyment (ENJ) and perceived usefulness (USE) respectively. The investigated behavioral intentions in the post-adoption stage are continued use intention (CUI), discontinued use intention (DUI) and contribution intention (CI). More importantly, the research model analyses the moderating effect of user conception (UC) between aspects of perceived enjoyment, perceived usefulness and perceived ease of use, and continued use intention, discontinued use intention and contribution intention. The introduction of the moderator role of user conception sheds light on how users' perceptions of a dual IS interact with their perceived benefits in affecting their post-adoption use intentions. The model is presented in Fig. 1.

2.4.1. Perceived ease of use

Davis (1985, p. 26) defined perceived ease of use as "the degree to which an individual believes that using a particular system would be free of physical and mental effort". Ease of use increases utilitarian value by decreasing the effort spent using a system; and hence it enhances performance indirectly by saving time spent on using the system. The positive effect of perceived ease of use on perceived usefulness in the post-adoption stage has been shown in several studies (e.g. Davis et al., 1989; Ozturk et al., 2016). In addition, the negative association between effort of use and the utilitarian benefit of service use has also been demonstrated (Dai, Hu, & Zhang, 2014). On the other hand, the hedonic value of a system is dependent on the interaction process that takes place - the easier the system is to use, the more enjoyment the user gets. Besides this, ease of use may also mitigate negative user experiences such as the frustration caused by an arduous interface (Hamari & Koivisto, 2015). This is supported by Dai et al.ös study (2014) where they showed that effort for use was negatively associated with the hedonic benefits derived from mobile technology mediated services. Therefore, we propose that the positive influence of perceived ease of use on perceived usefulness and perceived enjoyment carries on to the post-adoption stage.

H1a. Perceived ease of use positively affects perceived enjoyment.

H1b. Perceived ease of use positively affects perceived usefulness.

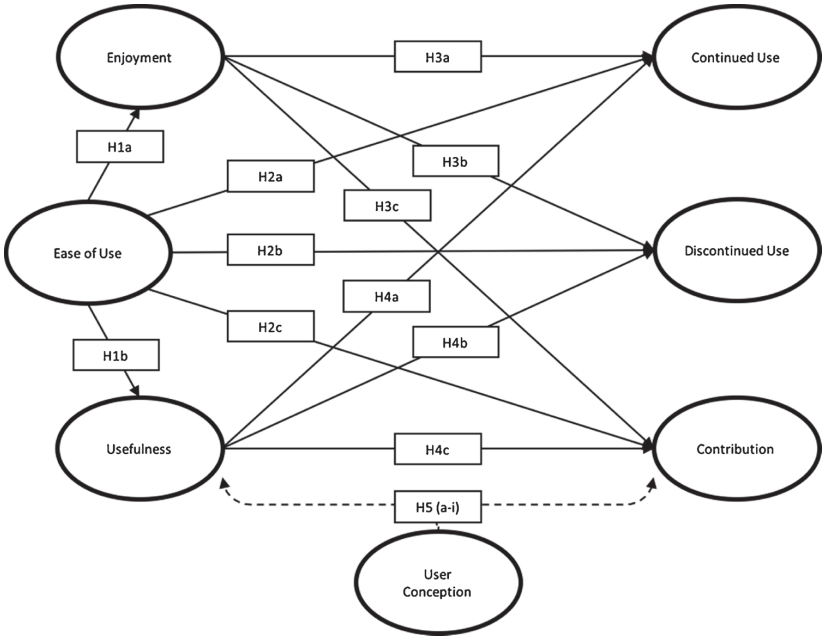

Fig. 1. Research model for investigating the moderating effects of users' utility-fun conception of a system on the relationship between their perceived enjoyment and usefulness of the system, and their post-adoption intentions.

The effect of perceived ease of use has been widely studied in technology adoption literature and its positive affect on attitude formation and intention to use a technology is now unquestioned. Its effects also continue on to the post-adoption stage. For example, its positive direct effect on continued use intention has been shown in the context of online gamified exercise services (Hamari & Koivisto, 2015) and smartphone functions (Xu, Ryan et al., 2012), in addition to its indirect positive influence in the context of smartphone applications (Choi, 2017) and social networking services (Kefi, Mlaiki, & Kalika, 2010). Also, Dai et al. (2014) have shown that effort for use was negatively associated with value assessment as an antecedent of continued use intention in the context of mobile technology services. As can be expected, a lack of perceived ease of use would increase discontinued use intention, and for instance, in the context of online assignment systems, it has been seen that a lack of ease of use caused students not to use the system (Geri & Naor-Elaiza, 2008). Also, system response time was found to be inversely related with user satisfaction, which may also lead to discontinued use (Hoxmeier & DiCesare, 2000). Therefore, we propose that perceived ease of use will have a positive effect on continued use intention (H2a) and a negative effect on users' discontinued use intention (H2b). The influence of perceived ease of use on contribution intention has also featured in several studies. For instance, Hsu and Lin (2008) showed that ease of use was positively related to antecedents of intention to blog (which is a form of knowledge sharing activity), and He and Wei (2009) showed a significant negative effect of perceived effort on contribution intention in the context of knowledge management systems. Hence, we propose that perceived ease of use will have a positive direct effect on contribution intention (H2c).

H2a. Perceived ease of use has a positive effect on continued use intention.

H2b. Perceived ease of use has a negative effect on discontinued use intention.

H2c. Perceived ease of use has a positive effect on contribution intention.

2.4.2. Perceived enjoyment

Hedonic benefits stand for the inherent satisfaction and pleasure emanating from an activity (Deci & Ryan, 2000). Hedonic benefits of an activity such as enjoyment, entertainment or self-esteem can increase user performance and the quality of an experience (Ryan & Deci, 2000). Likewise, in the context of ISs, hedonic benefits are derived from interactions with the system. As the hedonic benefits increase during these interactions, the user's experience with the system will get better and they will continue using the system. Previous research on dual systems has shown the positive effects of hedonic benefits on continued use intention. For instance, Hamari and Koivisto (2015) showed that perceived enjoyment positively affected continued use intention in the context of an online gamified exercise service (Hamari & Koivisto, 2015), and Barnesö study (2011) revealed that enjoyment positively influenced continued use intention both directly and indirectly in the context of virtual worlds. Accordingly, we hypothesize that perceived enjoyment will positively affect continued use intention (H3a). On the other hand, perceived enjoyment will undermine the intention to discontinue using a system (H3b). This is because hedonic benefits increase satisfaction with a system (e.g. Deng et al., 2010; Maier et al., 2015), and enhanced satisfaction with the system will decrease the discontinuance intention (Bhattacherjee, 2001). Previous research has studied how intrinsic benefits affect contribution intention in various system types. For example, Shah (2006) found that a critical subset of open source software developers participated because of the enjoyment they derived from the activity; Kankanhalli et al. (2005) showed that enjoyment in helping others positively affected knowledge contribution intention in the context of electronic knowledge repositories; and Nov (2007) indicated that enjoyment was the top motivator for contribution intention in the context of the Wikipedia online content community. Therefore, we hypothesize that perceived enjoyment will positively affect contribution intention (H3c).

H3a. Perceived enjoyment has a positive effect on continued use intention.

H3b. Perceived enjoyment has a negative effect on discontinued use intention.

H3c. Perceived enjoyment has a positive effect on contribution intention.

2.4.3. Perceived usefulness

Utilitarian benefits refer to goal/task fulfillment that is external to the user-system interaction, and it manifests itself in terms of performance increase, functional use, time efficacy, etc. through the use of technology. Previous research has confirmed the importance of utilitarian benefits for users' continued use of a system and their contribution to it in different forms. For instance, Bhattacherjeeös study (2001) of online banking users and Barnesö study (2011) on virtual worlds demonstrated the positive effect of perceived usefulness on continued use intention. Other research has also indicated the positive effect of utilitarian benefits on continued use intention in the context of online games (Chang et al., 2014), mobile hotel booking systems (Ozturk et al., 2016) and social virtual worlds (Zhou, Fang, Vogel, Jin, & Zhang, 2012). Therefore, we hypothesize that perceived usefulness will positively affect continued use intention (H4a). In contrast, in absence of relevant instrumental gains, users will be inclined to abandon using an IS as a result of low satisfaction with it (Bhattacherjee, 2001). Accordingly, incompatibility with needs has also been found to be an important reason for discontinuance (Geri & Naor-Elaiza, 2008; Tully, 2015), and Kim, Lee, and Kimös study (2008) showed that usefulness was an important element for mobile data service users who discontinued using the system. Therefore, we hypothesize that perceived usefulness will negatively affect discontinued use intention (H4b). Prior research has shown that various extrinsic motivators positively influence contribution intention. For example reputation (as one type of utilitarian benefit) is a consistent determinant of contribution intention across contexts such as blogging (Hsu & Lin, 2008), online photo sharing communities (Nov, Naaman, & Ye, 2010), electronic networks of practice (Wasko & Faraj, 2005) and open source software projects (Fang & Neufeld, 2009); as well as other utilitarian benefits such as organizational rewards (Kankanhalli et al., 2005) and self-development (Nov et al., 2010). Additionally, Hung, Lai, and Chang (2011) found that perceived usefulness positively influenced knowledge sharing intention in the context of electronic knowledge repositories. Therefore, we hypothesize that perceived usefulness will positively affect contribution intention (H4c).

H4a. Perceived usefulness has a positive effect on continued use intention.

H4b. Perceived usefulness has a negative effect on discontinued use intention.

H4c. Perceived usefulness has a positive effect on contribution intention.

2.4.4. User's utility/fun conception of the system

Gamified dual ISs attempt to offer both hedonic and utilitarian benefits to their users through gameful experiences. As a result, users may classify these ISs differently in the utility-fun continuum: Those users that view the system as utility-oriented may seek instrumentality ignoring the experiential characteristics of the system, while others may look for more emotive, multisensory reinforcements in their interactions. Therefore, these different conceptions may influence users' experiences with a system. Similar studies in the retail field have shown that a task-oriented consumer tended to find high arousal retail environments unpleasant, as opposed to pleasure-oriented consumers who enjoyed these environments more (Kaltcheva & Weitz, 2006). In the context of online retailing, Lee et al. (2006) showed that a hedonic shopping orientation positively affected perceived enjoyment. Likewise, Wakefield and Whitten (2006) showed that when users found their interactions with a system to be more playful, their perceived enjoyment and perceived usefulness increased, and their perceived enjoyment and intention to use were highest when they felt the system was for hedonic use and their interaction with it was playful. On the other hand, it was also found that a utilitarian shopping orientation positively affected perceived usefulness (Lee et al., 2006). Similarly, the usefulness of mobile data services was also found to be a more important aspect for discontinuers than continuers (Kim, Lee, & Kim, 2008). Therefore, we argue that for those users who regard use of the IS more as play, the influence of enjoyment will be stronger on their post-adoption intentions (H5[a-c]); and vice versa, for those users who regard the IS more as a utility, the influence of perceived usefulness will be stronger on their post-adoption intentions (H5[d-f]). Finally, it has been established by previous research that perceived ease of use is a more prominent factor for hedonic systems since a lack of perceived ease of use can lead to frustration that can be viewed as an antithesis of enjoyment (e.g. Gerow et al., 2013; van der Heijden, 2004); and regardless of a cumbersome interface, the information system may still prove relatively useful because of non-interface aspects of the system. Similarly, Choiös multi-group analysis (2017) showed that perceived ease of use positively affected the antecedents of continued use intention more for hedonic smartphone applications than for utilitarian ones in the post-adoption stage. Therefore, we hypothesize that perceived ease of use will be less important with regards to post-adoption intentions for users that view the system as utility-oriented, than for those that view the system as fun-oriented (H5[g-i]).

H5 [a-c] . The more the user conceives the system to be fun-oriented, the more perceived enjoyment will positively influence continued use intention (H5a), the more it will negatively affect discontinued use intention (H5b), and the more it will positively affect contribution intention (H5c).

H5 [d-f] . The more the user conceives the system to be utility-oriented, the more perceived usefulness will positively affect continued use intention (H5d), the more it will negatively affect discontinued use intention (H5e), and the more it will positively influence contribution intention (H5f).

H5 [g-i] . The more the user conceives the system to be utility-oriented, the less perceived ease of use will positively affect continued use intention (H5g), the less it will negatively affect discontinued use intention (H5h), and the less it will positively influence contribution intention (H5i).

3. Methods and data

3.1. MyDriveAssist – a gamified drive assistant

The data for this study was gathered from users of the gamified crowdsourcing application myDriveAssist. MyDriveAssist is a mobile app (iOS and Android) that uses the smartphone camera and image recognition technology to read traffic signs while driving. The gathered information is visualized for the user and shared with other users via a cloud, in order to generate a comprehensive, aggregated map of speed limit information (Bosch Automotive Middle East, 2014). In the case where a driver has overlooked a traffic sign, he can look at the app to get an overview of his current speed limit and passing conditions, which is the main utility of the app. In addition, the app uses GPS to determine the current speed of the driver and warns if the applicable speed limit is being exceeded by way of a message in the app and an audio signal, which provides additional utilitarian benefits. The warnings can be configured to the individual needs of the user. However, drivers have the option to opt out of collecting street signs and sharing their data with the community. In other words, they could for example deny access to the phone camera from the application and use only the crowdsourced data.

Several gamification features such as a score and a badge system are integrated into the app to make the application more playful. The score system visualizes the number of street signs collected by the user and provides instant positive feedback on the user's performance (Jung et al., 2010). The various badges (2017, Hamari, 2013) that are implemented can be unlocked by specific behaviors (e.g. collect a specific amount of traffic signs, drive according to the speed limit specified on the collected street signs, collect street signs at night, collect street signs while it is raining, collect successive patterns of road signs, use the app for a specific amount of time, etc.). There are two types of badges in myDriveAssist, badges where the behavior required to unlock the badge is communicated to the user as a clear goal (Hamari, 2017) and badges that can be unlocked as a positive surprise and reward for a specific behavior without informing the user about these hidden badges in advance. If the user chooses not to collect street signs, he would not be able to collect the scores or badges available for this specific behavior in the application.

MyDriveAssist was chosen for this research because previous research has indicated that such crowdsourcing applications are among the most gamified applications, and that points and badges are among the most frequently applied gamification design features (Koivisto & Hamari, 2019; Morschheuser, Koivisto et al., 2017). Hedonic benefits such as need satisfaction, enjoyment, and playfulness are attributed to such gamification components in the literature (Hamari, 2013, 2017; Seaborn & Fels, 2015). In particular, hedonistic feelings such as competence satisfaction or a sense of accomplishment might be aroused when a badge is earned as a reward or experience of status and reputation when a user compares their own badges with those of others (Hamari, 2013). For these reasons, myDriveAssist represents an epitome of a gamified system. Furthermore, Deterding et al. (2011) state that gamified systems are uniquely suited for use in different instrumental or gameful modes. Therefore, this application provides a suitable setting in which to test our hypotheses, particularly those related to users' fun/utility conceptions of the system. Screenshots from the myDriveAssist application are presented in Fig. 2 below.

3.2. Data collection

The users of myDriveAssist were reached by implementing an announcement in the app that appeared when a user opened the app. We shared a short description of the study and a link to participate in the survey. The survey was only accessible by users of the service that clicked the link in the app. The survey was optimized for mobile use and was active for half a year. In total, 3262 users followed the link and viewed the survey, and 562 users provided a full and valid set of data. An incentive to complete the survey was offered in the form of a prize draw for the chance to win one of three electric screwdrivers and five 10€ Amazon vouchers.

Table 1
Demographic details of the respondents: gender, age and frequency of using the application.

	Frequency	Percent		Frequency	Percent
Gender			**Frequency of use**		
Female	20	4%	rarely	156	27.8%
Male	542	96%	monthly	72	12.8%
			once a week or less	73	13.0%
Age (mean = 41.47; SD = 12.94)			a few times a week	152	27.0%
< 25	54	9.6%	once a day	42	7.5%
25-35	127	22.6%	multiple times a day	67	11.9%
35-45	155	27.6%			
45-55	142	25.3%			
55-65	58	10.3%			
> 65	26	4.6%			

Table 1 outlines the demographic details of the participants. 77% of the participants were from Germany, 6% from France, 4% from Switzerland and the rest from other European countries. On average, the participants used the app for 101.7 days (SD = 191.4 days, Median = 10 days).

3.3. Measurement

The constructs and measurement items of the study are presented in Appendix A. All items except for demographic variables and utility-fun conception of the system were measured on a 7-point Likert scale (strongly disagree – strongly agree). The items for ease of use were adopted from the previous study of van der Heijden (2004). Hedonic benefits were measured by an enjoyment variable and its construct was an amalgamation of items used by van der Heijden (2004) and Davis

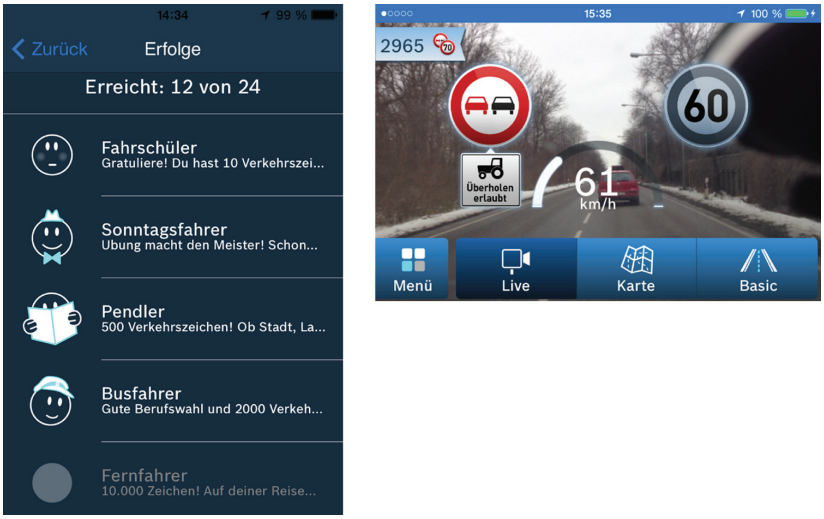

Fig. 2. Screenshots from myDriveAssist application.

et al. (1992). Utilitarian benefits were measured by usefulness variable whose items were adopted from van der Heijden (2004). Users' conceptions of the system were measured using a semantic differential with three bipolar items, each on a 7-point scale with opposing adjectives on each side of the scale (serious-fun, instrumental-entertaining and work-related-leisure-related). The last item was omitted from the construct because the loading was rather low (0.453), although it was still higher than with any other construct. The measures of the dependent variables were all adopted from prior research: Continued and discontinued use intention (Turel, 2015), and contribution intention (Lin, 2007). The contribution intention items were adapted to the context of the crowdsourcing application used in this study.

3.4. Validity and reliability

We evaluated the model via component-based PLS-SEM using SmartPLS 3 (Hair, Hult, Ringle, & Sarstedt, 2016). Compared to covariance-based SEM, component-based PLS-SEM is recommended for prediction-oriented models such as the one featured in the present study (Anderson & Gerbing, 1988; Chin, Marcolin, & Newsted, 2003). We identified one item with low factor loadings (UOR3) which was consequently removed from the analysis.

The measurement instruments were assessed by investigating their convergent and discriminant validity. The convergent validity (see Table 2) was assessed with three metrics: Cronbach's alpha (Alpha), average variance extracted (AVE) and composite reliability (CR). Convergent validity was seen as being met since all of these convergent validity metrics were clearly greater than the thresholds suggested by relevant literature (i.e. the Alpha of each construct should be greater than 0.7, AVE of each construct should be greater than 0.5, CR of each construct should be greater than 0.7 (Fornell & Larcker, 1981)). Discriminant validity was assessed with two approaches: Firstly, we checked whether the square root of the AVE of each construct was greater than the correlations between it and other constructs (see Chin, 1998; Fornell & Larcker, 1981; Jöreskog & Sörbom, 1996). Second, we assessed the discriminant validity by confirming that each item had the highest loading with its corresponding construct. The conducted tests indicated that the discriminant validity and reliability was acceptable.

Our sample size (N = 562) also satisfies several different criteria for determining the lower bounds of sample size for PLS-SEM (Anderson & Gerbing, 1988; Chin, 1998), and is therefore seen as acceptable.

4. Results

Fig. 3 and Table 3 present the results of the SEM analysis. The model explained 51.1% of the variance in continued use intention, 21% of the variance in discontinued use intention and 28.8% of the variance in contribution intention. As hypothesized, the results showed that enjoyment positively affected continued use (H3a) ($\beta = .289$, $p < 0.01$) and contribution intention (H3c) ($\beta = .238$, $p < 0.01$), and negatively affected discontinued use intention (H3b) ($\beta = -0.222$, $p < 0.01$). Notably, the effect size on continued use intention was stronger than contribution and discontinued use intentions. The results also indicated that, in line with H4a and H4c, usefulness positively affected continued use ($\beta = .283$, $p < 0.01$) and contribution intentions ($\beta = .216$, $p < 0.01$). However, contrary to the hypothesis (H4b), the negative association between usefulness and discontinued use intention was not significant ($\beta = -.062$). Furthermore, the results showed that ease of use positively affected enjoyment ($\beta = .595$, $p < 0.01$) and usefulness ($\beta = .497$, $p < 0.01$). Hence, hypotheses H1a and H1b were supported. Moreover, ease of use had a direct positive effect on continued use intention ($\beta = .135$, $p < 0.01$), which confirmed hypothesis H2a, and contribution intention ($\beta = .131$, $p < 0.01$), which confirmed hypothesis H2c. But, it had no significant direct effect on discontinued use intention, so H2b was not supported.

Considering the users' conceptions of the system, we found that user conception positively moderated the association between enjoyment and continued use intention ($\beta = .221$, $p < 0.01$), and negatively the association between enjoyment and discontinued use intention ($\beta = -.161$, $p < 0.05$). In other words, the more a person regards the activity as being fun-related, the more enjoyment increases the person's continued use intention (H5a), and the more enjoyment decreases the person's discontinued use intention (H5b). However, there was no significant moderation effect on the association between enjoyment and contribution intention. The interaction between ease of use and user conception was significant with regards to the dependent variable of continued use intention ($\beta = -.142$, $p < 0.05$). This implies that contrary to our hypothesis H5g, the more utility-oriented the user is, the more perceived ease of use will augment their continued use intention. Finally, the interaction between usefulness and user conception was significant with regards to the dependent variable of discontinued use intention ($\beta = .081$, $p < 0.1$). Put differently, the more utility-oriented the user is, the more perceived usefulness will decrease their discontinued use intention. To sum up, three (H5a, H5b, H5e) of the nine hypotheses regarding user conception were supported, but the results showed the opposite to be true for hypothesis H5g. Table 4 presents a summary of the hypotheses tests together with their results.

5. Discussion

Commonly, a system's purpose as either hedonic or utilitarian has been deemed to be the decisive determinant of why users interact with an IS (Gerow et al., 2013; van der Heijden, 2004). The use of hedonic ISs was accepted to be driven mainly by intrinsic motivations (e.g. perceived enjoyment, playfulness, flow), and it was established that utilitarian ISs were used primarily for meeting extrinsic motivations (e.g. performance, productivity). Yet, the emergence of dual ISs through novel applications such as gamification has blurred the reasons for engagement with these systems. This is because many of these gamified systems can be used either purely as an instrumental system, purely as a game, or as a combination of both where work and play take turns or merge into one. Therefore, users may perceive these ISs as either utility or fun oriented. Thus, these differing perceptions of the system may interact with users' experiences with it to ultimately influence their use intentions (e.g. post-adoption intentions) either negatively or positively. Therefore, the technology continuance area in the IS realm has

Table 2
Convergent validity and discriminant validity measures of the measurement instruments.

	Alpha	AVE	CR	CUI	DUI	ENJ	EoU	CI	USE	UC
CUI	0.880	0.806	0.926	**0.898**						
DUI	0.880	0.806	0.926	−0.587	**0.898**					
ENJ	0.800	0.625	0.869	0.611	−0.359	**0.790**				
EoU	0.767	0.587	0.850	0.501	−0.274	0.595	**0.766**			
CI	0.891	0.822	0.933	0.416	−0.179	0.476	0.399	**0.907**		
USE	0.808	0.722	0.886	0.621	−0.322	0.643	0.497	0.470	**0.850**	
UC	0.803	0.835	0.910	0.374	−0.351	0.279	0.295	0.255	0.397	**0.914**

Note: Square roots of AVEs are reported in bold in the diagonal.

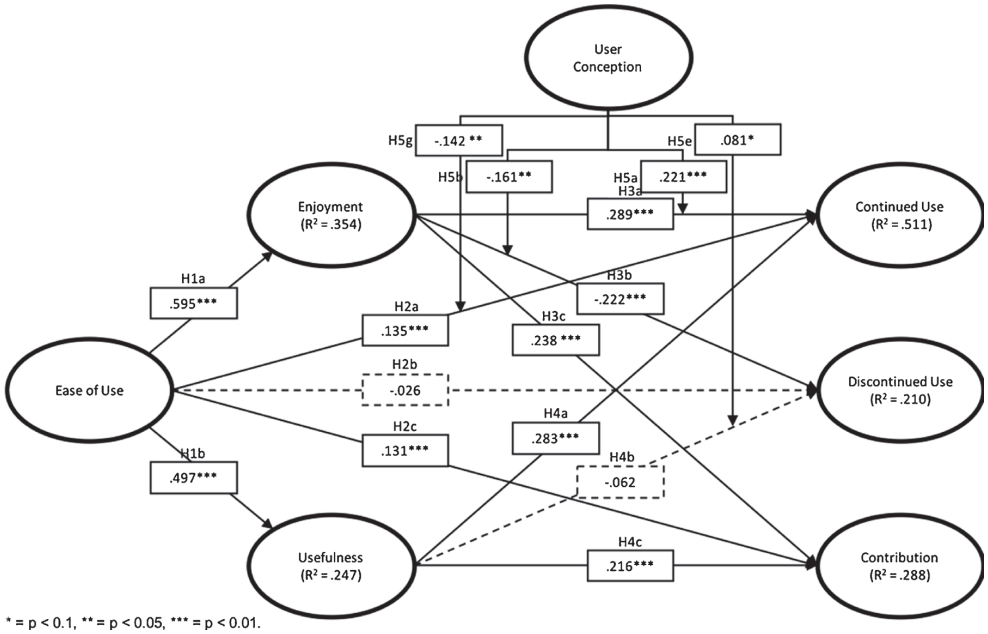

Fig. 3. Parameter estimates and explained variance of the structural equation model.

Table 3
Parameter estimates and explained variance for the structural equation model.

Independent variable	Beta	CI95 low	CI95 high	p
Continued use intention (R^2 = .511)				
ENJ	.289***	.189	.396	.000
USE	.283***	.154	.399	.000
EoU	.135***	.045	.232	.004
EoU (total effect)	*.448****	*.365*	*.534*	*.000*
ENJ x UC	.221***	.083	.350	.001
USE x UC	−.014	−.131	.083	.810
EoU x UC	−.142**	−.263	−.006	.029
Discontinued use intention (R^2 = .210)				
ENJ	−.222***	−.327	−.114	.000
USE	−.062	−.168	.057	.282
EoU	−.026	−.129	.065	.595
EoU (total effect)	*−.189****	*−.294*	*−.086*	*.000*
ENJ x UC	−.161**	−.284	−.021	.014
USE x UC	.081*	−.006	.175	.082
EoU x UC	.055	−.063	.154	.342
Contributions (R^2 = .288)				
ENJ	.238***	.141	.340	.000
USE	.216***	.105	.320	.000
EoU	.131***	.042	.221	.004
EoU (total effect)	*.380****	*.304*	*.460*	*.000*
ENJ x UC	.014	−.107	.143	.825
USE x UC	.031	−.062	.157	.576
EoU x UC	−.036	−.140	.060	.480

thus far suffered a blind spot stemming from the increased gamification of ISs and the way in which an information system can play differential roles for different people in terms of how they are employed in their daily lives and work environments. This study examined the interaction effects between users' conceptions of a dual system and the established antecedents of IS use (perceived enjoyment, usefulness and ease of use) on technology post-adoption intentions (use continuance, discontinuance and contribution) in a dual IS. The dual information system chosen for the study was a gamified crowdsourcing system, which provided a suitable setting for the research aims. The theoretical and managerial implications and limitations of the study are discussed below, together with possible directions for future research.

5.1. Theoretical implications

The study has a number of implications for research. First, we introduced a revised way of understanding technology continuance; namely, the investigation of whether users perceive the system to be more utility or leisure oriented (outside the actual derived benefits of its use). The results revealed significant moderating effects of user conception between perceived enjoyment, perceived ease of use and perceived usefulness, and post-adoption intentions, namely continued and discontinued use. User conception moderated perceived enjoyment's relation with continued and discontinued use intention. The first moderating effect implies that the more fun-oriented/less utility-oriented the person thinks the system is, the more enjoyment positively affects continued use intention. The second interaction implies that the more fun-oriented/less utility-oriented the user thinks the system is, the stronger the negative effect of enjoyment on discontinued use intention. In other words, a lack of enjoyment for a person who views the system as fun-oriented would increase their discontinued use intention. Another interaction was seen between user conception and perceived usefulness on their effect on discontinued use intention. The path coefficient between perceived usefulness and discontinued use intention across the entire data was non-significantly negative. However, we found that for users that view the system as utility-oriented, there is much clearer negative association between perceived usefulness and discontinued use intention. The result of the moderation analysis implies that as user conception shifts from utility to fun, the negative impact of usefulness on discontinued use intention diminishes, and eventually for users that view the system as extremely fun-oriented, it loses its entire significance as a determinant of discontinuance intention. These effects denote that while perceived enjoyment and usefulness are prominent antecedents of IS continued use, their effects are influenced by users' utility/fun conceptions of the system. Furthermore, in contrast to e.g. van der Heijdenös (2004) conclusions, they shift the

Table 4
Summary of the hypotheses tests.

H#	*Relationships*	*Result*	*Support*
H1a	Perceived ease of use → Perceived enjoyment	.595***	Yes
H1b	Perceived ease of use → Perceived usefulness	.497***	Yes
H2a	Perceived ease of use → Continued use intention	.135***	Yes
H2b	Perceived ease of use → Discontinued use intention	−.026	No
H2c	Perceived ease of use → Contribution intention	.131***	Yes
H3a	Perceived enjoyment → Continued use intention	.289***	Yes
H3b	Perceived enjoyment → Discontinued use intention	.222***	Yes
H3c	Perceived enjoyment → Contribution intention	.238***	Yes
H4a	Perceived usefulness → Continued use intention	.283***	Yes
H4b	Perceived usefulness → Discontinued use intention	−.062	No
H4c	Perceived usefulness → Contribution intention	.216***	Yes
H5a	User conception X Perceived enjoyment → Continued use intention	.221***	Yes
H5b	User conception X Perceived enjoyment → Discontinued use intention	−.161***	Yes
H5c	User conception X Perceived enjoyment → Contribution intention	.014	No
H5d	User conception X Perceived usefulness → Continued use intention	−.014	No
H5e	User conception X Perceived usefulness → Discontinued use intention	.081*	Yes
H5f	User conception X Perceived usefulness → Contribution intention	.031	No
H5g	User conception X Perceived ease of use → Continued use intention	−.142**	No
H5h	User conception X Perceived ease of use → Discontinued use intention	.055	No
H5i	User conception X Perceived ease of use → Contribution intention	−.036	No

* = $p < 0.1$, ** = $p < 0.05$, *** = $p < 0.01$

focus from merely considering the hedonic vs utilitarian nature of systems to also considering the users' conception of the system as the determinant of continued use of ISs, particularly dual ISs. The last significant interaction was observed between user conception and perceived ease of use regarding continued use intention: The more fun-oriented the person thinks the system is, the less perceived ease of use affects his/her continued use intention. In other words, perceived ease of use is a more prominent factor for users who view the system as an instrumental tool. This result lies contrary to previous research that has established perceived ease of use as being more important for hedonic systems (e.g. Gerow et al., 2013; van der Heijden, 2004). This effect could result from different reasons, one of which might be that in a gamified dual IS, fun-oriented users may be more open towards challenges and the complexity of the interface (e.g. Malone, 1981) and thus more tolerant towards any lack in perceived ease of use of the application, compared to utility-oriented users who want to get their job done as efficiently as possible. However, future research is needed which explicitly focuses on this aspect to achieve further clarity. User conception showed no significant interactions for contribution intention, however, future research to check for possible interactions with other antecedents such as organizational rewards, reputation and enjoyment in helping others might be interesting.

A second implication of the study was that the results showed that both enjoyment and usefulness were prominent determinants of post-adoption intentions, both in regard to continued use and contribution intentions. For all of the three behavioral intentions, enjoyment had a more significant effect than usefulness, and in fact, perceived usefulness did not have a significant effect on discontinued use intention. These results support the view that gamified ISs are dual systems (Hamari & Koivisto, 2015), and highlight the importance of both enjoyment and usefulness in continued use of dual ISs. Particularly, the role of enjoyment in mitigating users' discontinued use intentions is remarkable. This might be explained by several reasons. Firstly, the attained badges and positive feedback provided by gamification aspects might cause users to internalize the use of the system; hence, even if they do not gain any more utilitarian benefits they may continue using the gamified IS. Other reasons for the role of enjoyment in mitigating users' discontinued use intentions might be that the same gamification elements cause a loyalty effect and therefore prevent users from e.g. switching behavior, or that enjoyment may cause habit formation (Turel & Serenko, 2012).

In summary, the most important theoretical implication of this study is the theorization of users' fun/utility conceptions of a dual IS and providing new empirical evidence for its interaction with user experience (i.e. perceived enjoyment, usefulness and ease of use) on affecting post-adoption intentions. The findings confirm that user conception is an important antecedent of users' post-adoption intentions. Therefore, it potentially draws the focus away from the mere nature of ISs as the determinant of continued use intention, and shifts it towards an understanding that today's ISs are in fact multifaceted systems that may be used in mixed use cases according to their users' perceptions. Another contribution of the study is the analysis of discontinued use intention in the context of a gamified dual IS, showing how it is primarily affected by enjoyment as opposed to usefulness. Therefore, scholars should keep in mind that omitting considerations of hedonic benefits (e.g. enjoyment) in research may result in potential misinterpretations related to the discontinued use of dual ISs. In addition, the results strengthen the view that gamified ISs are dual systems. Previous research has viewed search engines, instant messaging, mobile Internet, Web use, personal computers, mobile services and blogs as dual ISs (Gerow et al., 2013; Wu & Lu, 2013). This study adds one more type of IS, the gamified IS, to this group of dual systems.

5.2. Managerial implications

The findings of this study also provide implications for managers and designers involved in the development of multipurpose ISs. An overall practical implication stemming from this research as well as from the general lines of developments of ISs towards multipurpose ISs, is that designers should be aware that users may increasingly demand that all systems be both utilitarian and hedonic. Work-related systems should be increasingly able to satisfy the intrinsic needs of users, whereas at the same time, playing games (hedonic ISs) should increasingly seek to provide utility (e.g. gamification or games-with-a-purpose). It is evident that the degree of expectations of both utility and fun from IS use differs from user to user, and that users may primarily regard the same systems as either utility- or fun-oriented, or something in between. Hence, it becomes increasingly important for practitioners to consider how and to what degree they will cater for this expectation space. Therefore, users' conceptions of the system should be considered in the context of contemporary ISs because these systems can in practice serve several purposes simultaneously, but also separately, depending on user needs and perceptions. Based on the empirical evidence presented in this study, system designers should take into account that enjoyment might be more influential on continued and discontinued use intentions of users that view the system as fun-oriented, when compared to those who view the system as more utility-oriented. Moreover, users that

view the system as fun-oriented are probably more likely to benefit from hedonic facets of the system (such as gamification) and be more inclined to continue using it as a consequence. Therefore, practitioners should consider adding hedonic elements such as gamification features into their systems, if their target users are likely to be more fun-oriented. Considering the previous research related to age (e.g. Bittner & Schipper, 2014; Koivisto & Hamari, 2014) and gender (e.g. Koivisto & Hamari, 2014; Venkatesh & Morris, 2000; Yang & Lee, 2010) regarding the effects of hedonic and utilitarian benefits, an action point for practitioners might be to consider age and gender as surrogate variables by which to gauge their target population's hedonic and utilitarian view of a system or to provide tailorable interfaces that can balance hedonic and utilitarian elements according to users' conceptions and/or preferences. Through use of these tailorable interfaces, users may customize the system with regards to what features (either utilitarian or hedonic) are enabled or disabled in accordance with their preferences for system use. Furthermore, the finding that perceived ease of use interacts with user conception suggests that designers should highlight perceived ease of use more if their target users may view the system as utility-oriented. Finally, enjoyment showed a strong positive effect on continued use intention and a strong negative effect on discontinued use intention. Thus, enriching ISs via gamification (employing attributes such as goal-setting, feedback structures, narrative, roleplay (Koivisto & Hamari, 2019)), appealing visual layouts that combine elements like colors, sounds and animated images (Childers et al., 2001; van der Heijden, 2004), image interactivity (Lee et al., 2006), and flexibility in navigation (Childers et al., 2001) can have long-term benefits for user retention and the further profitability of information systems. Tellingly, accumulated research shows that intrinsic motivation tends to affect the quality of experience and performance better than extrinsic motivation (Ryan & Deci, 2000).

5.3. Limitations and future research

As with all research, this study has some limitations that provide avenues for future research. First, even though there is no *a priori* reason to assume that the context of this study has influenced the results, the findings might be somewhat context-dependent to the dual IS we selected. So, in order to increase the generalizability and robustness of the study findings, future research should try to replicate the study in other contexts and compare the results with samples of other dual ISs.

As a second consideration, the fact that majority of the survey respondents were male restricts the generalizability of results to larger populations where female users also constitute a significant portion of the users. The large number of male survey respondents may also have an effect on the results of the user conception construct, and previous research has found that females tend to be more receptive towards hedonic benefits in ISs (e.g. Venkatesh & Morris, 2000). Therefore, we predict that the interaction effects of user conception would have been stronger had there been more female respondents in the survey. However, the survey respondents in this study mirror the users of the system because the considered gamified IS was designed for technology-savvy motorists and appeals to a majority of male users. Thus, the fact that a larger part of our survey respondents were male can be seen as a result of the self-selection process of the surveyed population. However, future research may look to analyze systems where there is a more balanced number of male and female users.

As a third consideration, the data for this study was gathered by way of a survey and thus reflects users' perceptions instead of their actual behaviors. Future studies which include measurements of actual user behavior based on usage data, could further increase the robustness of the results.

Finally, we encourage researchers to deepen the line of investigation regarding how hedonic value may prevent users from discontinuing their use of a system. This is due to the inverse relationship found between perceived enjoyment and the discontinued use intention constructs used in this study. In addition, IS discontinuation may have several forms, e.g. replacement (Parthasarathy & Bhattacherjee, 1998) or quitting (Turel, 2015). Therefore, researchers may look into how gamification affordances could prevent users from discontinuing their use of an IS in these different contexts. Another line for future work might be the analysis of the effect of user conception on satisfaction, based on expectation confirmation theory (Bhattacherjee, 2001), or on contribution intention by way of other antecedents such as reputation or enjoyment in helping others.

6. Conclusion

Today, a growing number of ISs combine features stemming from both utilitarian and hedonic systems, and technological developments such as gamification have been increasingly imbued into utilitarian systems. As a result of this convergence in contemporary ISs, it is no longer so that users use systems that are primarily utilitarian and designed solely for instrumental purposes, or hedonic systems designed solely for hedonic gratification. Therefore, users today can view gamified dual ISs with varying degrees of hedonic and utilitarian perception. In this paper, we investigated to what extent a user's utility/fun conception of a gamified dual system interacts with their experience of system use (enjoyment, usefulness and ease of use) to affect their technology use intentions (continued use, discontinued use and contribution intentions). We conclude from the findings that a user's utility/fun conception has a significant role in the continued use of a gamified system, especially with respect to the enjoyment derived from its use. Hence, we suggest that system designers should create adaptable interfaces that can appeal to users' varying utility-fun perceptions of dual systems such as gamified ISs.

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Appendix A. Overview of the constructs, measurement items, scales and sources

Construct	Measurement items	Scale	Source
Enjoyment (ENJ)	To what extent do you agree/disagree with the following statements? ● I find using the App interesting ● I find using the App enjoyable ● I find using the App exciting ● I find using the App fun	7-point "strongly disagree" - "strongly agree" scale	van der Heijden, 2004; Hamari & Koivisto, 2015
Ease of use (EoU)	To what extent do you agree/disagree with the following statements? ● The interaction with the App is clear and understandable ● Interaction with the App does not require a lot of mental effort ● I find the App easy to use ● I find it easy to get the App to do what I want it to do	7-point "strongly disagree" - "strongly agree" scale	van der Heijden, 2004

Usefulness (USE)	To what extent do you agree/disagree with the following statements? ● By using the App I am better informed about speed limits and traffic rules ● By using the App I can better make decisions while driving than in the past ● By using the App I can capture traffic information (speed limits and traffic rules) more quickly and easily than in the past	7-point "strongly disagree" - "strongly agree" scale	van der Heijden, 2004
Continued use (CUI)	To what extent do you agree/disagree with the following statements? ● I intend to use this App in the next 3 months ● I predict I would use this App in the next 3 months ● I plan to use this App in the next 3 months	7-point "strongly disagree" - "strongly agree" scale	Turel, 2015
Discontinued use (DUI)	To what extent do you agree/disagree with the following statements? ● I intend to stop using this App in the next 3 months ● I predict I would stop using this App in the next 3 months ● I plan to stop using this App in the next 3 months	7-point "strongly disagree" - "strongly agree" scale	Turel, 2015
Contribution (CI)	To what extent do you agree/disagree with the following statements? ● I intend to share information (speed limits, no crossing zone etc.) with the App's community (cloud) frequently in the future ● I will try to further share information (speed limits, no crossing zone etc.) with the App's community (cloud) ● I will always make an effort to share new information (speed limits, no crossing zone etc.) with the App's community (cloud)	7-point "strongly disagree" - "strongly agree" scale	Lin, 2007
User conception (UC)	All in all, I consider the App to be… ● serious - fun ● instrumental - entertaining ● work-related - leisure-related *(omitted)*	7-point semantic differential scale	Developed by the authors

Appendix B. Cross-loadings: results of factor loadings of the measurement items

	CUI	DUI	ENJ	EoU	CI	USE	UC
CUI1	**0.855**	−0.463	0.486	0.381	0.325	0.488	0.337
CUI2	**0.921**	−0.540	0.561	0.452	0.381	0.588	0.344
CUI3	**0.917**	−0.571	0.592	0.506	0.409	0.589	0.330
DUI1	−0.552	**0.902**	−0.366	−0.273	−0.176	−0.307	−0.326
DUI2	−0.493	**0.903**	−0.288	−0.224	−0.161	−0.256	−0.278
DUI3	−0.530	**0.889**	−0.305	−0.236	−0.144	−0.298	−0.336
ENJ1	0.487	−0.330	**0.722**	0.390	0.346	0.434	0.239
ENJ2	0.564	−0.320	**0.803**	0.530	0.434	0.622	0.325
ENJ3	0.385	−0.187	**0.811**	0.413	0.359	0.49	0.131
ENJ4	0.467	−0.279	**0.821**	0.525	0.353	0.464	0.159
EoU1	0.352	−0.226	0.443	**0.790**	0.274	0.372	0.283
EoU3	0.409	−0.261	0.481	**0.816**	0.302	0.394	0.263
EoU4	0.481	−0.229	0.538	**0.815**	0.389	0.47	0.239
CI1	0.381	−0.17	0.439	0.334	**0.901**	0.427	0.228
CI2	0.393	−0.183	0.431	0.369	**0.923**	0.428	0.235
CI3	0.358	−0.135	0.426	0.383	**0.896**	0.423	0.231
USE1	0.546	−0.307	0.495	0.418	0.357	**0.839**	0.376
USE2	0.463	−0.208	0.549	0.376	0.389	**0.829**	0.284
USE3	0.566	−0.297	0.594	0.465	0.448	**0.881**	0.348
UC1	0.301	−0.294	0.236	0.277	0.243	0.316	**0.901**
UC2	0.378	−0.344	0.272	0.263	0.226	0.405	**0.926**
UC3 *(omitted)*	0.122	−0.037	0.044	0.084	0.119	0.228	**0.453**

All standardized factor loadings were statistically significant with $p < 0.01$.
Item loadings onto the intended construct are reported in bold.

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IV

ROLLING OR SCROLLING? THE EFFECT OF CONTENT TYPE ON HABITUAL USE OF FACEBOOK

by

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Rolling or Scrolling? The Effect of Content Type on Habitual Use of Facebook

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Abstract

The paper investigates how content type (i.e., hedonic and utilitarian content) is related to satisfaction, habitual use, use intensity and discontinued use intentions in the context of social media services. The research model was empirically tested using a survey study (n = 142) that was conducted among Facebook users. The results show that hedonic content is a strong predictor of habitual use of and satisfaction with Facebook. In turn, utilitarian content has a positive effect on satisfaction; however, it does not significantly affect habitual use. Additionally, habit affects use intensity more than satisfaction but has no significant effect on discontinued use intention. These results suggest that emphasizing hedonic content might be more effective in creating habitual use of a system. However, the balance between hedonic and utilitarian content should be arranged so that it is optimum for user satisfaction and does not cause excessive use of the system.

Keywords: Hedonic content, Utilitarian content, Habit, Social media services, Facebook, Dual information systems, Use intensity, Discontinued use intention, Satisfaction

Introduction

Many contemporary information systems (IS) are as successful as the amount of time that people spend on them. For this reason, many of these systems are designed to be habit-forming or addictive (Oremus 2017). For example, scarcity in the form of temporarily available snaps or statuses, notifications, presence features, and feedback forms, such as number of likes, are highly habit-forming features of social media (Ali et al. 2018; Andersson 2018). Infinite scroll, in other words, swiping through content endlessly, is a highly habit-forming feature, whose design was inspired by the bottomless bowl experiment (Andersson 2018). Predictably, social media services, such as Facebook and Twitter, thrive on this feature; they provide endless amounts of content, personalized according to their users' consumption. Still, among the most "hooking" features of digital applications are reward and infotainment; content that is both enjoyable and informative is a key addictive feature (Ali et al. 2018). Therefore, many contemporary IS converge these two types of content, which can be consumed according to the user's context, and they are referred to as dual IS (Chesney 2006; Wu and Lu 2013). Users can both receive their news from Facebook and spend hours watching cat videos. Likewise, Twitter is used for various ends, such as political campaigns, entertainment, and advertisements. However, it is not only the social media services that have both hedonic and utilitarian content and are designed to be habit-forming. Other types of dual IS may contain both hedonic and utilitarian content and can be used habitually as well. For instance, gamified systems, with their affective and informational feedback (Hassan et al. 2019), blend hedonic and utilitarian content to increase user motivation and engagement in various activities (Koivisto and Hamari 2019).

Despite the various habit-forming uses of content by practitioners in different types of dual IS, its effect on habituated use largely remains unresearched, not to mention the quality of the content's importance in making people keep using the system (Zhou et al. 2018). Additionally, while the success of IS through habituated use constitutes one side of the coin, unhealthy use of IS by consumers because of this habituation constitutes the other. Internet addiction is prevalent among 6% of users globally (Cheng and Li 2014). It is currently being debated for inclusion in the official list of diseases by health professionals, just as gaming addiction was recognized as a disorder by the World Health Organization (Brey et al. 2019). Moreover, to predict and control behavioral patterns particularly related to health, studying habit and the factors causing it can provide novel insights (Ouellette and Wood 1998).

In this vein, the research objective of this study is to investigate the relation between content type and habitual use in the context of social media services (i.e., Facebook). More specifically, the research question is "Does hedonic or utilitarian content predict habituated use, satisfaction, use intensity, and discontinued use intention in the context of dual IS?". To achieve this aim, cross-sectional data from Facebook users were collected through a psychometric survey. Facebook is one of the prominent social media services that contains a rich amount of content that appeals differently to different people. Besides, its dual nature, along with other social media and social networking services, is increasingly recognized (e.g., Cocosila and Igonor 2015; Hu et al. 2015; Xu et al. 2012). Therefore, it is a suitable system for testing our research question.

This research investigates a relatively unexplored area in the IS literature and enriches existing studies on content type and the use of dual information systems. It contributes to research by studying the relationship between content type, habitual use, use intensity and discontinued use intention. In fact, it is the first study to empirically test the effects of hedonic and utilitarian content on habitual use, use intensity and discontinued use intention. Therefore, it contributes to theory by examining previously unexplored relationships. The results of this study provide design implications regarding social media and social networking services, and also other types of dual IS. In brief, they inform about how content can be tailored for optimum user experience.

The remainder of this paper is organized into eight sections. The second section introduces the concept of dual IS and describes how contemporary technologies converge both hedonic and utilitarian benefits. The third section discusses content and its various forms in the IS context. The fourth section introduces the concepts of satisfaction and habit in the context of IS. The fifth section presents the research model and the hypotheses. The sixth section describes the study data and methods and presents the results. In the seventh section, theoretical and design implications, as well as limitations and directions for future research, are discussed. And the paper conclusions are presented in the last section.

Dual Information Systems

The initial utilitarian IS were designed for use in organizational contexts to replace manual tasks, with the aim of increasing employee efficiency and performance. In many cases, this human-work profit was gained through automation and could be measured by task duration, error rate, and learning time (Butler 1996). For these reasons, when interacting with these systems, the users focused on the outcomes that were external to system use, such as task completion and performance increase. With the proliferation of IS in non-organizational consumer contexts, their uses diversified. A second type emerged - hedonic IS, which were mainly used for the pleasure derived from them (van der Heijden 2004). Some examples of these hedonic systems were viewed as video games, Internet services, and other systems that are used in leisure environments.

However, today, the boundary between hedonic and utilitarian systems is no longer clear due to technological developments, such as Web 2.0, and design strategies, including gamification. These types of systems are recognized as mixed/dual IS and are used for both utilitarian and hedonic purposes, according to the context-of-use (Chesney 2006) or the task at hand (Wu and Lu 2013). They combine features from both hedonic and utilitarian systems so that fun and utility are experienced at the same time (Gerow et al. 2013). Today, an increasing number of systems are viewed as dual IS (Köse and Hamari 2019). For example, several studies (e.g., Cocosila and Igonor 2015; Hu et al. 2015; Xu et al. 2012) demonstrate the utilitarian use of online social networks despite being initially perceived as

hedonic-only systems, and games are now widely used for utilitarian purposes (e.g., simulation games, serious games) (Hamari and Keronen 2017). Therefore, contemporary technologies are increasingly combining pleasure and utility in various forms. One common way to achieve this is by taking advantage of content. Next, we discuss content in the IS context in more depth.

Content in the Information Systems Context

Information artifact is one of the major components of IS artifacts (e.g., Iivari 2017; Lee et al. 2015), and IS success largely depends on the quality of information, as indicated by DeLone and McLean (1992) almost three decades ago. Despite having acknowledged these aspects, the mainstream IS research has largely disregarded the importance of information assets available in IS (Iivari 2017).

In the realm of traditional IS, the information artifacts are designed at a meta-level, for instance, at the level of entity–relationship diagrams, database schemas, or report layouts (Iivari 2017). However, in contemporary technologies, the content available to a user can take different forms (e.g., images, words, other types of media), and its different aspects gain importance. Emojis, icons, avatars, a video game's layout and background, the messages received from a system, and so on, are all different types of content consumed by users. In the world of social media, with the emergence of Web 2.0, users are also creators of content that is unstructured by nature. Here, content becomes the essence of a system (Kietzmann et al. 2011); in fact, it is manipulated so that users gain habitual use of the system (Ali et al. 2018; Andersson 2018; Oremus 2017).

In the IS field, the effects of content have been studied by considering its different assets, comprising its inherent hedonic or utilitarian value (Barelka et al. 2013; Dumlao and Ha 2013; Hassan et al. 2019; Torres et al. 2014), its contextual quality in the form of its timeliness and relevance to the user's context (Koivumaki et al. 2008; Zhou et al. 2018), its interactional quality (Koivumaki et al. 2008; Pianesi et al. 2009), its effect on emotions (e.g., Wenninger et al. 2019), and its overload (e.g., Zhang et al. 2016). All these studies show that the content's different assets significantly affect users' satisfaction with and perceived benefits from the use of the system. In fact, an explorative study found that low content quality (particularly low relevance and credibility) could cause users to discontinue using the system (Zhou et al. 2018). However, the researchers have been unable to identify studies that analyzed the aspects of content and their relation to habitual use.

Satisfaction and Habitual Use

Satisfaction and habitual use are two important antecedents of IS use behavior (Bhattacherjee and Lin 2014). Satisfaction is an affective state formed as a result of the appraisal of the difference between expectations about the consumption experience (i.e., IS usage experience) and the actual experience. The level of satisfaction increases when the expectations are low or a system's performance is better than expected, and it decreases when expectations are higher than the perceived performance of a system. In the latter case, users may develop dissatisfaction because of their unmet expectations.

Habits are behavioral tendencies to repeat responses in steady supporting contexts (Ouellette and Wood 1998). More explicitly, they are goal-directed behaviors that are automatically activated by environmental cues, whose mental representations have been formed by frequent performance of the same behavior in similar situations (Aarts et al. 1998). Therefore, these automatic behaviors strongly depend on the stability of the stimulus; as long as the situations are similar across time and settings and there is no change in behavioral goals, the performance of habitual behavior requires minimal attention and effort (Ouellette and Wood 1998). In line with prior conceptualizations, Limayem et al. (2007) define the IS habit as "the extent to which people tend to perform behaviors (use IS) automatically because of learning" (p. 709). Therefore, the IS habit is not guided by conscious intentions. Rather, it might be triggered by environmental cues, such as the task to be performed with the system or the mere presence of the technology itself at the device or the feature level (Guinea and Markus 2009).

Research Model and Hypotheses

Continued use of IS is a behavior that is not only reasoned, purposeful, or intentional but is also emotional and habitual (Guinea and Markus 2009). In fact, habitual use and satisfaction are salient antecedents of sustained usage of IS and their success (Bhattacherjee and Barfar 2011; Bhattacherjee and Lin 2014). Nonetheless, for today's IS, increased use intensity has become a sign of IS success in addition to sustained usage. However, use intensity can be a sign of not only a system's success but also pathological use patterns. While people are using a service, they may also consider quitting for various reasons, or this discontinuance intention may surface contextually. For this reason, it is important to understand different antecedents of discontinuance intention as well. Therefore, this research studies how content type affects users' habitual use of and satisfaction with IS to eventually influence users' use intensity and discontinued use intentions. To sum up, we analyze the direct effects of hedonic and utilitarian content on satisfaction and habitual use, as well as the direct effects of satisfaction and habitual use on use intensity and discontinued use intention. Thus, we are also able to compare how habit and satisfaction influence use intensity and discontinued use intention. The research model is presented in Figure 1.

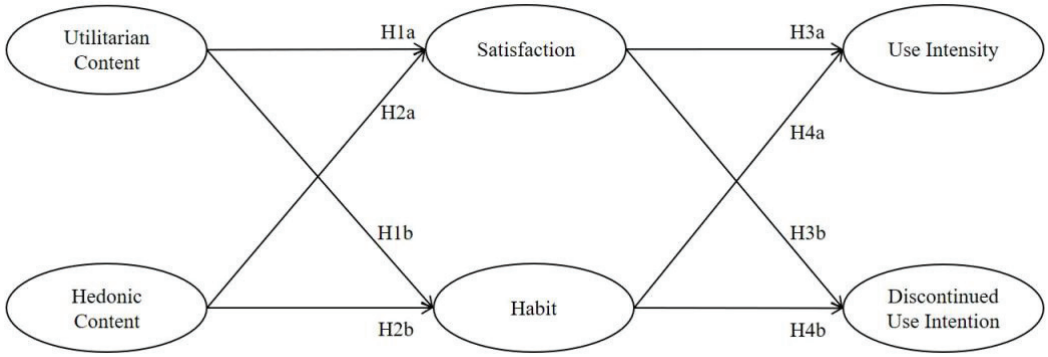

Figure 1. The Research Model

Hedonic and Utilitarian Content

On one hand, hedonic content stands for those aspects of IS that convey pleasurable messages to their users or enable users' enjoyable experiences by providing entertainment, for example. These may take different forms, such as icons, avatars, goal achievement messages, and videos that may be perceived as pleasurable by the users. On the other hand, utilitarian content provides knowledge and contributes to specific tasks or objectives of the users (Dumlao and Ha 2013). Consuming content that meets users' expectations or needs, in terms of pleasure or utility, increases user satisfaction. In turn, satisfactory experiences with the behavior strengthen their connection to the pursued goals, thus increasing the likelihood of habit formation (Aarts et al. 1998). For instance, Dumlao and Ha (2013) show that hedonic and utilitarian tweet quality positively affects user satisfaction with Twitter. Similar research is also supportive of these hypothesized positive effects. For example, in the context of the gamified exercise service HeiaHeia, it has been found that affective feedback has a positive effect on perceived benefits and continued use intention, and informational feedback has a positive effect on continued use intention (Hassan et al. 2019). It is important to note that perceived benefits are influential antecedents of satisfaction, and continued use intention is a prominent antecedent of continued use behavior. Another study on the Chinese microblogging service Sina Weibo shows the importance of content quality (e.g., relevance) for continued use of the system (Zhou et al. 2018). Considering these findings, the following hypotheses are formulated:

H1a. *Utilitarian content positively affects satisfaction.*

H1b. *Utilitarian content positively affects habit.*

H2a. *Hedonic content positively affects satisfaction.*

H2b. *Hedonic content positively affects habit.*

Satisfaction

When users are unsatisfied with a system, it is likely that they will not form positive intentions toward that service. In fact, they may form a discontinued use intention, which is a user's mental predisposition to abandon using the system (Bhattacherjee 2001). Discontinued use intention may be assumed as the opposite of continued use intention in a continuum; however, it has different antecedents than continued use intention (Turel 2015). This is because of the co-existence of multiple attitudes toward a psychological object and their emergence in particular contexts (Ajzen 2001). Therefore, dissatisfaction is only one of the reasons why people may discontinue a system's use and/or switch to an alternative. The negative effect of satisfaction on discontinued use intention has been demonstrated in the context of Facebook by previous research as well (e.g., Maier et al. 2015; Turel 2015). Similarly, previous studies have shown the positive effects of dissatisfaction on discontinued use intention in the context of Facebook (Wirth et al. 2015) and in the context of the Chinese social networking service Qzone (Zhang et al. 2016).

Although intention is a prominent antecedent of behavior, it is not equivalent to behavior; in fact, in some cases, people may act differently from their intentions. In the post-adoption context, intentions play a lesser role because users are less likely to spend cognitive resources on forming them when they can rely on more efficient stimulus-based responses through the links between stimulus and action, such as satisfaction (Bhattacherjee and Lin 2014). Therefore, measuring use behavior instead of continued use intention is a more suitable approach in this context. A common conceptualization of behavior in the IS context is use intensity (Venkatesh et al. 2008). Use intensity is the extent to which an information system is used. It reflects both the time spent using the system and the users' cognition of the extent of their use. Satisfaction as an emotive concept affects use behavior (Bhattacherjee and Barfar 2011; Bhattacherjee and Lin 2014). Therefore, satisfaction with a system will have a direct effect on use intensity; the more satisfied the users are, the more intensely they would use the system (within the boundaries of their needs and goals). Previous research has also shown the direct positive effect of satisfaction on usage behavior (e.g., Bhattacherjee and Lin 2014; Limayem and Cheung 2008). Therefore, the following hypotheses are formulated:

H3a. *Satisfaction positively affects use intensity.*

H3b. *Satisfaction negatively affects discontinued use intention.*

Habitual Use

Although the performance of habitual behavior does not require conscious intentions, people are inclined to form favorable intentions about acts they have performed repetitively in the past (Ouellette and Wood 1998). Therefore, we posit that habit will be negatively related to discontinued use intention. Besides, automatically triggered IS usage is less prone to discontinuance (Limayem et al. 2007). Moreover, erasing automatic use of IS requires strong motives that can override the habit and discontinue the use of the system. Previous research also supports this notion; Turel (2015) shows the negative effect of habit on discontinued use intention in the context of Facebook, and Zhou et al. (2018) find that low habit is one of the reasons for discontinuing the use of the Chinese microblogging service Sina Weibo. Other examples can be cited from the contradicting continued use intention; the positive effect of habit on continued use intention has been shown in the context of the virtual world Second Life (Barnes 2011) and in the context of online shopping (Liao et al. 2006).

When use intensity is high, it can be an antecedent of problematic technology use. In fact, its relation to conflicts involving family, work, and personal well-being has been shown by previous research regarding mobile social networking services (Zheng and Lee 2016). When a system is used habitually, the users may not be paying attention to the amount of time spent using the system. Turel (2015) argues about this effect through habit's numbing influence on self-observation and judgmental processes; habit reduces thinking about the system, the consequences of its use, and specifically stopping its use. Habit's

direct positive effect on usage behavior has been shown in previous research as well (e.g., Bhattacherjee and Lin 2014; Limayem and Hirt 2003); therefore, we posit the following hypotheses:

H4a. *Habit positively affects use intensity.*

H4b. *Habit negatively affects discontinued use intention.*

Empirical Study

The research model and the purported hypotheses are studied via a cross-sectional survey. The majority of the survey items were adapted from previous research to the context of our study. Habitual use items were adopted from the previous studies by Turel (2015) and Limayem et al. (2007). Satisfaction items were adopted from Bhattacherjee's (2001) study, and discontinued use intention items were taken from the study of Maier et al. (2015). Hedonic and utilitarian content items were constructed in line with the dimensions conceptualized in previous research (DeLone and McLean 1992, 2003; van der Heijden 2004). All items, except satisfaction, use intensity, and demographic variables, were measured on a 7-point Likert scale (ranging from strongly disagree to strongly agree). Satisfaction was measured using a semantic differential on a 7-point scale. The items were changed to reflect Facebook use. The item set is presented in Appendix A.

The survey's target population comprised foreigners living in Finland. This group constitutes a suitable population for investigating the research question because they adopt Facebook for various uses, such as job hunting, self-promotion, buying/selling stuff, and coordinating/following events, as well as feelings of community and support. The reason why they do so might stem from the language barrier they face in Finland. Although English is commonly spoken in Finland, many services and jobs are available only in Finnish and Swedish, the two official languages of the country. Therefore, foreigners living in Finland take advantage of Facebook to maintain their lives.

The survey was published in September 2019 in various Facebook groups that bring together foreigners living in Finland. It was actively promoted over a two-month period; during this time, 142 responses were gathered. The incentive to complete the survey was a chance to win one of three €50-gift cards (Amazon, Ticketmaster, or Lippu.fi). The respondents' demographic information is shown in Table 1.

Table 1. Demographic details of the respondents: age, gender, and time using the service.

Age range	N	%	Gender	N	%	Time using the service	N	%
17–20	3	2.1	Female	88	62.0	Less than 3 months	3	2.1
21–25	31	21.8	Male	52	36.6	3 months–6 months	1	0.7
26–30	47	33.1	Other	2	1.4	1 year–2 years	1	0.7
31–35	33	23.2				2 years-4 years	4	2.8
36–40	12	8.5				4 years-6 years	15	10.6
41–45	7	4.9				More than 6 years	118	83.1
Above 45	9	6.3						
Total	142	100.0		142	100.0		142	100.0

Validity and Reliability

The collected data were analyzed via partial least squares structural equation modeling (PLS-SEM) using SmartPLS 3 software. PLS-SEM is more advantageous than co-variance-based structural equation modeling from several perspectives. First, PLS-SEM has no restrictive assumptions about the distribution of the data. Second, it can offer solutions in small sample sizes. Third, it allows unrestricted use of single-item and formative measures. Fourth, it is more suitable for exploratory or predictive research (Hair et al. 2019).

For reflective factors, convergent validity was assessed through composite reliability (CR), Cronbach's alpha (Alpha), and average variance extracted (AVE). CR should be greater than 0.7 (Hair et al. 2019),

Alpha should be greater than 0.7 (Kline 2011), and AVE should be greater than 0.5 (Fornell and Larcker 1981; Hair et al. 2019).

Discriminant validity was assessed using AVE; for each latent variable, the square root of AVE was checked against the variable's correlation with other latent variables to see whether or not it was higher (Fornell and Larcker 1981). The cross-loadings were also checked to validate that no indicator had a higher correlation with another latent variable than its own.

Use intensity was measured as a formative construct. Therefore, its measurement fit was assessed through the path-loading significance of its indicators. The indicators with insignificant path loadings were excluded from the model. Additionally, the indicators of formative factors should not display excessive multicollinearity (Hair Jr et al. 2016); this was also checked through the variance inflation factors (VIF). It was also verified that the use intensity's indicators loaded on their intended composite factor (i.e., use intensity) and that their cross-loadings with other factors were not high.

After these checks, we dropped four items from the measurement model: HCONTENT3 because it was loading on both utilitarian and hedonic content variables higher than 0.7, UCONT1 and UCONT2 because their loadings were lower than 0.7, and USEI3 because its path loading was not significant. Table 2 presents the results of these assessments after HCONTENT3, UCONT1, UCONT2, and USEI3 were dropped from the measurement model.

Table 2. Convergent and Discriminant Validity

	Alpha	CR	AVE	DUI	HABIT	HCONT	SAT	USEI	UCONT
DUI	0.838	0.902	0.753	0.868					
HABIT	0.765	0.865	0.682	-0.190	0.826				
HCONT	0.872	0.913	0.723	-0.322	0.573	0.851			
SAT	0.932	0.951	0.830	-0.320	0.475	0.621	0.911		
USEI				-0.198	0.518	0.340	0.336		
UCONT	0.838	0.902	0.754	-0.334	0.496	0.711	0.530	0.268	0.868

DUI = discontinued use intention, HABIT = habitual use, HCONT = hedonic content, SAT = satisfaction, USEI = use intensity, UCONT = utilitarian content, Alpha = Cronbach's alpha, CR = composite reliability, AVE = average variance extracted. The figures in the diagonal correspond to the square roots of AVE for each construct. The square root of AVE for USEI is missing because this construct was measured as formative.

The data set used in this study consisted of cross-sectional self-reported responses. Therefore, common method bias was a potential threat to the validity of the conclusions as a potential source of measurement error (Podsakoff et al. 2003). In order to prevent common method bias, procedural and statistical remedies were applied. Procedurally, the measurement items were located in a randomized manner and it was ensured that measures of the same-construct were at least six items apart (Podsakoff et al. 2012). Statistically, Harman's single factor test (Podsakoff et al. 2003) and a full collinearity assessment approach (Kock 2015) were used. The results of Harman's single factor test showed four factors with eigenvalues higher than 1 and they cumulatively accounted for 69.40% of the total variance. In addition, the most significant factor accounted for less than 50% of the variance. With regards to full collinearity test, variance inflation factors (VIFs) were generated for all latent variables in the model, and there was no occurrence of a VIF greater than 3.3. Therefore, the model can be considered free of common method bias.

Results

The results of the analysis are presented in Figure 2. The research model explains 27.8% of Facebook use intensity and 10.4% of discontinued use intention regarding Facebook. Moreover, utilitarian and hedonic content account for 34.4% of the variance in the habitual use of Facebook and 40.2% of the variance in the satisfaction with it.

Overall, all hypotheses, except H1b, H3a, and H4b, are supported. In line with H1a, utilitarian content has a positive effect on satisfaction with Facebook but has no significant effect on the habitual use of

the system. Therefore, H1b is not supported. Hedonic content is found to be a strong predictor of both satisfaction with Facebook (H2a) and its habitual use (H2b). Satisfaction has a positive yet insignificant effect on use intensity. Therefore, H3a is not supported. However, it negatively influences discontinued use intention, which supports H3b. This means that the more satisfied people are with Facebook use, the less likely they intend to abandon its use. Habit is found to be a strong predictor of use intensity (H4a). Moreover, it has a negative but insignificant effect on discontinued use intention. Therefore, H4b is not supported.

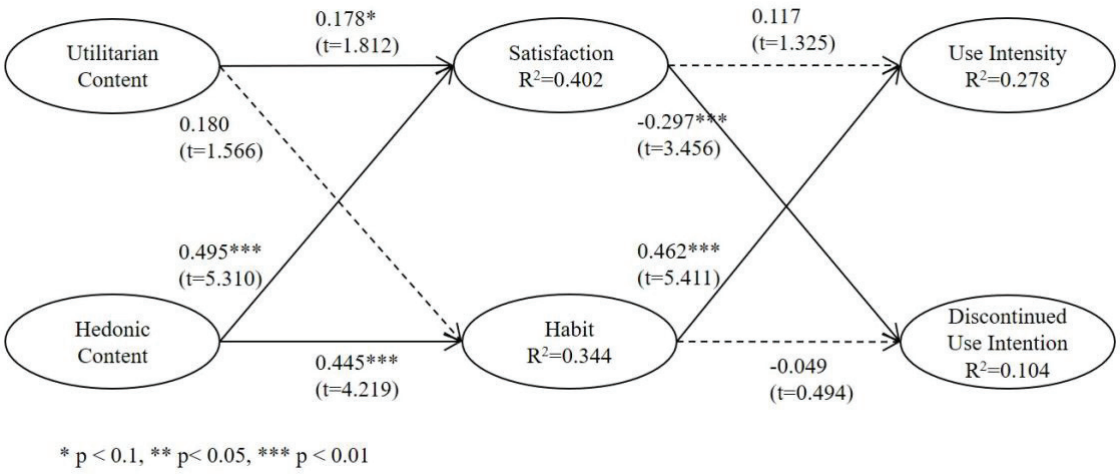

Figure 2. Path Model Results

Discussion

Theoretical Implications

The focus of this research was the effects of hedonic and utilitarian content on the habitual use and the use intensity of a social media service, Facebook. Discontinued use intention was also one of the studied constructs. Overall, the results of this research show that hedonic content consumption is a strong predictor of habitual use and consequent use intentions and use intensity. This research has several theoretical implications and contributions particularly with respect to the largely disregarded area of information assets in the IS field (Iivari 2017) and the use of dual IS.

First, the results indicate that hedonic content is more influential on the habitual use of a dual information system, specifically Facebook, in comparison to utilitarian content. A possible reason is that intrinsic benefits (i.e., pleasurable experiences) are more effective in creating repetitive actions and therefore learned behavior that causes automatic responses. In contrast, utilitarian content has no significant effect on the habitual use of Facebook. This remarkable finding can have implications for other types of dual IS as well.

Second, both utilitarian and hedonic content have a positive effect on satisfaction with Facebook, but hedonic content's effect is more prominent in comparison. Though initially formed as a service for connecting people, Facebook has transformed into a dual information system, serving both hedonic and utilitarian purposes. Despite this transformation, the above-mentioned result demonstrates that overall, hedonic content is still the type that is expected more from Facebook (ignoring the individual user's conception of the system). It also points out that IS satisfaction is derived not only from plain utility but also from pleasurable content.

Third, the results show that use intensity is largely predicted by habitual use. In fact, satisfaction with the system has no significant effect on use intensity. This means that satisfaction with an information system does not project the users' overuse of it; it is habit that paves the way for technology overuse. This finding may also be explained by the lack of cognitive deliberation or consideration of a user's own behavior that is present in habitual use patterns (Ouellette and Wood 1998; Turel and Serenko

2012). Once a habit is formed, people do not recognize or pay attention to the amount of time they spend on an information system, which might lead to an extended length of time spent on the service.

As expected, satisfaction with the system decreases discontinued use intention (Bhattacherjee 2001). However, habit does not show a significant (albeit negative) effect on it. This result is contrary to the previous research finding that habit reduces discontinuance intentions (Turel 2015), and it might stem from the fact that people who habitually use a system do not think about its use but demonstrate their behavior without any contemplation or explicit intention. Nonetheless, this result requires further research to be generalized.

Practical Implications

From a design and management perspective, the results have several implications. To begin with, the results can be interpreted from the view on Facebook as an example of a dual information system; therefore, the findings can also have implications for other types of dual IS.

In terms of habitual use, the findings point out the importance of hedonic content. Accordingly, system managers and designers can emphasize the type of content available in their system. For instance, a Facebook feed may be tailored to show less hedonic/utilitarian content to form or prevent habitual use of the system. This way, users can have an optimum experience with the system that aligns with their needs and goals. This inference may also be applied to for instance gamified systems regarding enhanced affective or informative feedback (see Hassan et al. 2019).

The importance of habitual use for use intensity is also apparent. Therefore, time spent on the service can be used for measuring the degree of habitual use (or one-step further addiction). Thus, different types of content can be displayed to the users according to the amount of time they spend on the service.

Nonetheless, system designers and managers should carefully arrange the balance between hedonic and utilitarian content. Utilitarian content is a significant predictor of satisfaction with the system; thus, its lack may positively affect discontinued use intentions. In the context of social media services, this balance may be achieved by tailoring the newsfeed with an appropriate blend of informative and hedonic content. In the context of gamified systems, this can be achieved through the balance of informative and affective feedback. Other types of dual IS should be considered individually, according to their content characteristics.

Limitations and Future Research

This study has several limitations. First, the study should be replicated in other types of dual IS in order to be able to generalize the findings. Second, the data was gathered using a cross-sectional survey; in order to discover causal effects, the study should be conducted using experimental methods. Third, the targeted population's possible reliance on Facebook use might have resulted in a biased sample, particularly with respect to the results regarding use intensity and discontinued use intention. Therefore, extending the sample to a more mixed group can provide a more thorough understanding of the topic.

This study opens up avenues for future research. Future studies can start with examining how content type is consumed demographically. In other words, researchers can analyze the moderating effects of demographic variables on the influence of content type on habitual use of or satisfaction with a system. People view and use dual IS differently (Köse et al. 2019); therefore, the features affecting their habit formation may also vary. Accordingly, future research may take into account user motivation when analyzing features that may cause habitual use. Another avenue for future research can be the analysis of the effects of specific content types (e.g., feedback) on habit formation or use intensity through longitudinal or experimental studies. Similar studies can be conducted on different types of dual IS, such as gamified systems, virtual worlds, and online shopping services. Another direction for future research may be studying how satisfaction or content type affects different forms of IS discontinuance (Soliman and Rinta-Kahila 2020; Zhou et al. 2018).

Conclusion

This study attempts to extend our knowledge regarding the effects of different forms of content on use of dual IS. The results show that hedonic content is more influential than utilitarian content with respect to habitual use. In fact, utilitarian content does not have a significant effect on habitual use. Satisfaction is positively influenced by both hedonic and utilitarian content; however, hedonic content's effect is more prominent. In addition, habitual use predicts a large portion of the variation in use intensity; however, satisfaction does not have a significant impact on it. Contrary to habitual use, satisfaction with the system plays an important role in the variation of discontinued use intention. The results of this study can provide information system managers and designers with useful insights regarding the use of content; they can derive implications with respect to habit formation and user retention in the context of dual IS.

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Appendix – The Survey Items

Indicator	Survey Item	Loading	References
HCONT1	The content on Facebook is enjoyable.	0.877	Developed by the authors based on van der Heijden's (2004) study
HCONT2	The content on Facebook is pleasant.	0.811	
HCONT3	The content on Facebook is interesting.*	0.846	
HCONT4	The content on Facebook is fun.	0.859	
HCONT5	The content on Facebook is exciting.	0.854	
UCONT1	The content on Facebook is accurate.*	0.661	Developed by the authors based on DeLone and McLean's (1992, 2003) studies
UCONT2	The content on Facebook is reliable.*	0.671	
UCONT3	The content on Facebook is relevant.	0.842	
UCONT4	The content on Facebook is informative.	0.876	
UCONT5	The content on Facebook is useful.	0.886	
HABIT1	Using Facebook has become automatic to me.	0.815	Limayem et al., 2007; Turel, 2015
HABIT2	Using Facebook is natural to me.	0.892	
HABIT3	When I want to interact with people, using Facebook is an obvious choice for me.	0.765	
SAT1	Very dissatisfied/Very satisfied.	0.921	Bhattacherjee, 2001
SAT2	Very displeased/Very pleased.	0.920	
SAT3	Very frustrated/Very contented.	0.884	
SAT4	Absolutely terrible/Absolutely delighted.	0.918	
USEI1	On average, how many minutes/hours each day do you use Facebook? (0–5 min, 5–15 min, 15–30 min, 31–60 min, 1–2 h, 2–3 h, more than 3 h)	0.831	
USEI2	How do you consider the extent of your use of Facebook? (Zero use: 1 2 3 4 5 6 7 : Very heavy use)	0.945	
USEI3	How often do you use Facebook?* (Less than once a day: 1 2 3 4 5 6 7 : Many times each day)	0.844	
DUI1	In the future, I prefer to use alternatives to Facebook.	0.873	Maier et al., 2015
DUI2	I prefer to use alternatives instead of continuing to use Facebook.	0.884	
DUI3	I prefer using alternatives to Facebook.	0.846	
* Dropped items			