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"Why pay premium in freemium services?" A study on perceived value, continued use and purchase intentions in free-to-play games

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ABSTRACT

Freemium has become de facto business model for games and many other online services. We investigate how consumers' perceived value is associated with their intention to use freemium services and to purchase premium content. We employ data gathered through an online survey (N = 869) among players of freemium/free-to-play games. Firstly, we find support for the "Demand Through Inconvenience" -hypothesis proposed in this study, indicating that the higher the enjoyment of the freemium service, the lower the intentions to purchase premium content but higher intention to use the service overall. Secondly, social value is found to positively affect freemium use and premium purchases. Thirdly, the quality of the freemium service does not seem to be associated with premium purchases although it has a positive association with freemium use. Fourthly, the economic value of freemium services is positively associated with freemium service use and via increased use also has a positive effect on premium purchases. The findings of the present study highlight the peculiarity of the freemium business model: increasing perceived value of the freemium service (i.e. enjoyment) may both add to and retract from future profitability via increased retention on one hand, reduced monetization on the other.

1. Introduction

During the last decade, especially in the online world, the "freemium" business model has spread into a variety of areas such as music (Dewan & Ramaprasad, 2014; Oestreicher-Singer & Zalmanson, 2013; Sinclair & Tinson, 2017; Wagner, Benlian, & Hess, 2014), magazines, social networks (Vock, Dolen, & Ruyter, 2013), cloud services (Kumar, 2014), and most pertinently to games (see Alha, Koskinen, Paavilainen, & Hamari, 2016; Cheung, Shen, Lee, & Chan, 2015; Hamari, 2015; Mäntymäki & Salo, 2013; Nieborg, 2015; Wu, Chen, & Cho, 2013). The so-called freemium business model (or "free-to-play" as it is known in the game industry) refers to a product/pricing structure where the core service is free, but revenue is generated through the sales of additional products and premium services (Kumar, 2014). Research shows that the freemium model has become the top choice for many online services, and has been especially prominent in the game industry. As a recent analysis of the top 300 apps in the Apple app store reveals, the majority of downloadable apps are games employing the free-to-play model (Brockmann, Stieglitz, & Cvetkovic, 2015).

What is interesting about the freemium model is that it differs fundamentally from the traditional retail model. In the freemium model, it is crucial to create value for augmenting products through a careful configuration of the interplay between the free core service and the premium products therein (e.g. see Baird & Raghu, 2015; Hamari & Lehdonvirta, 2010; Oestreicher-Singer & Zalmanson, 2013; Wagner et al., 2014; Wu et al., 2013). Traditionally, the price of products and services is naturally considered as one of the main determinants of customer surplus. For freemium services it is important to understand how people perceive the service's economic value. Whilst the upfront-payment in traditional retail models allows a simple evaluation, freemium services can dilute their economic value due to complex service structures and pricing schemes. This is especially the case in freemium games where the premium content is commonly sliced into hundreds of separate purchasable pieces. Such content slicing leads to a wide array of possible customer behavior patterns and variations in the total price paid for the service.

While an enjoyable and high-quality service can be considered an important foundation for any successful business venture, one of the postulated strategies of freemium operators has been to increase the desirability of additional products by intentionally increasing the frustration experienced with the free core service (Alha, Koskinen, Paavilainen, Hamari, & Kinnunen, 2014; Heimo, Harviainen, Kimppa, & Mäkilä, 2018; Lehdonvirta & Castronova, 2014; Zagal, Björk, & Lewis, 2013). This may be by making the service more inconvenient or more

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burdensome to use, or by placing some features of the service out of the reach of those users who are using it for free. In other words, these service providers can be considered to effectively create a "*demand through inconvenience*". Freemium services try to slim down their services after a trial period (Wagner et al., 2014), employ intrusive advertising campaign (Jankowski, Hamari, & Watrobski, 2019; Mäntymäki, Islam, & Benbasat, 2019) as well as employ gambling-like sale tactics (i.e. gamblification) (Macey & Hamari, 2019) to persuade users to purchase premium products. Similarly, in game environments several studies (Alha et al., 2014; Hamari & Järvinen, 2011; Hamari & Lehdonvirta, 2010; Hamari, 2015; Lin & Sun, 2011; Zagal et al., 2013) have noted that the game design is indeed used for creating demand for in-game premium content (see e.g. Lehdonvirta, 2009 on virtual goods) via various artificial limitations such as the intentional degradation of virtual items, planned obsolescence, or a fear of losing content which has been gathered in the game. Naturally, these strategies raise the question of how users perceive the enjoyment of the service when frustrating or intrusive (negative enjoyment) elements are intentionally incorporated into it, in order to create a demand for premium products. It is clear that a fine balance has to be achieved in order to both retain and monetize users.

Relatedly, concerns over the quality of freemium services have also been expressed as well as investigated as antecedents for use and purchase behavior in games (Hamari, Hanner, & Koivisto, 2017). Firstly, while the freemium model is being adopted by various types of companies, the majority of freemium service titles are developed by small teams with low market entry. Secondly, consumers might assume that any service that is offered for free cannot live up to the standards of a 'normally' priced product. Thirdly, prior considerations suggest that the aggressive monetization design incorporated in many titles may negatively affect the perceived quality of the service (Alha et al., 2014; Paavilainen, Hamari, Stenros, & Kinnunen, 2013). Fourthly, concerns about overly aggressive customer discrimination in freemium/premium services have been raised as it may create issues of inequality between users (Alha et al., 2014; Lin & Sun, 2011). According to previous literature, any differential treatment may affect customers' perceptions of the fairness of the service, especially in a situation that perceives the received treatment as being inferior to that which would be preferred (Mayser & von Wangenheim, 2013). People may also feel they are missing out ("fear of missing out") on the premium portions of the service, and as suggested by the principle of loss aversion, customers easily react more strongly to service quality which falls below their expectations (Hamari & Järvinen, 2011; Kahneman & Tversky, 1984; Mayser & Wangenheim, 2013).

Since many freemium services rely largely on social features and the content created through them (i.e. they contain elements such as user profiles, avatars, status updates and discussion forums), the service content and social experience are in many contexts inseparable (Oestreicher-Singer & Zalmanson, 2013). As Oestreicher-Singer and Zalmanson (2013) state "[c]*ontent is inherently a social experience. Content providers create social experiences in which the user creates a personal online identity and interacts with others. This social experience takes center stage on the website, replacing content.*" Indeed, in their quest to find ways to create demand for premium products, freemium businesses commonly capitalize on these social aspects by offering premium goods that users can use to enhance their social capital and show off to their peers (Hamari, 2015; Lehdonvirta, 2009; Oestreicher-Singer & Zalmanson, 2013). Thus, social value can be expected to have an impact on retention and monetization in freemium services.

This study aims to address the question of how perceived value (enjoyment, quality, economic value, and social value) of freemium services are associated with continued use intentions of freemium services, as well as the intention to purchase additional premium content. This empirical survey study (N = 869) is conducted in the context of free-to-play online games where the freemium model is the most widely used.

2. Theory and hypotheses

2.1. Perceived value

While the definitions of what actually constitutes customer value have differed (see e.g. Kim, Chan, & Gupta, 2007; Sánchez-Fernández & Iniesta-Bonillo, 2007; Sweeney & Soutar, 2001; Sheth, Newman, & Gross, 1991; Zeithaml, 1988), its relevance for businesses has been long acknowledged, for example as a source of customer loyalty (Parasuraman & Grewal, 2000) and for long term business success (e.g. Sweeney & Soutar, 2001). In order to fully understand the formation of customer value perceptions, various approaches have been employed during recent decades. Early customer perceived value conceptualizations emphasized the economic value of products and services, considering customer value as the ratio of quality and price (Sánchez-Fernández & Iniesta-Bonillo, 2007; Sweeney & Soutar, 2001). These early considerations often reduced the perceived value down to a unidimensional concept (Sánchez-Fernández & Iniesta-Bonillo, 2007). It was however acknowledged that considering value simply based on an economic perspective is too simplistic as there may be many sources from which value can be derived, for example the hedonic and aesthetic aspects of a product or service (e.g. Hirschman & Holbrook, 1982; Sweeney & Soutar, 2001). Therefore more nuanced perspectives were required. The first more refined framework by Sheth et al. (1991) contained a multidimensional approach to explain consumer choice, and included both utilitarian as well as hedonic components. Sweeney and Soutar (2001) developed this approach further and solidified the conceptual perceived value framework (PERVAL) for the general consumer perceived value of products and services. The framework is split into four dimensions: emotional, social, quality and economic, which allows for a more in-depth understanding of consumers' value formation, and consequently, of the effects of perceived value on customer behavior. While a large corpus of empirical research with differing emphases and foci employing the PERVAL framework has appeared during last years, the four dimensions of PERVAL have further been cemented as the core of perceived value measurement and are currently, considered as the primary measures of the concept.

Empirical studies on perceived value in digital contexts have been conducted for example with mobile financial services (Karjaluoto, Shaikh, Saarijärvi, & Saraniemi, 2018), mobile shopping (Lin & Wang, 2006; Shang & Wu, 2017), music streaming services (Fernandes & Guerra, 2019), SMS messaging (Turel, Serenko, & Bontis, 2007) and gamified services (Hsu & Chen, 2018; Hsu, Chen, Yang, & Lin, 2017). Moreover, similar questions including perceived value and neighboring frameworks have been applied pervasively in game environments (e.g. Guo & Barnes, 2011; Hsiao & Chen, 2016; Kim, Kim, & Choi, 2017), which is also indicated by e.g. reviews on adoption literature on games and purchase behavior for in-game goods (Hamari & Keronen, 2017a; Hamari & Keronen, 2017b).

However, studies from the perceived value in the context of freemium services are scarce. Consumer motivations and perceptions have thus far been studied for example from the perspectives of attitude towards extra premium purchases (Wagner et al., 2014), political economy (Nieborg, 2016), service quality (Hamari, Hanner et al., 2017), technology acceptance (Yan & Wakefield, 2018), theory of planned behavior/reasoned action (Hsiao, 2013; Schreiner & Hess, 2015), expectation-confirmation theory (Hsu & Lin, 2015), the design of freemium services and particularly related to combining service mechanics with the business model (Evans, 2016; Hamari & Lehdonvirta, 2010), and persuasiveness of the freeness (Wagner, Benlian, & Hess, 2013). Some studies exist on the perceived value in the context of freemium mobile games (Hsiao & Chen, 2016).

2.2. Freemium business models

The freemium business model can be defined as a product/pricing

structure where the core service is available free of charge, but revenue is generated through advertisement (Salo & Karjaluoto, 2007) or increasingly through selling additional content such as game items, various upgrades, better functionality (Hamari & Lehdonvirta, 2010; Kumar, 2014; Oestreicher-Singer & Zalmanson, 2013; Vock et al., 2013; Wagner et al., 2014). The essential idea of freemium services has been to draw and engage a large customer base with free entry pricing, which then translates to a smaller group of users who will pay for the premium content (Anderson, 2010; Oestreicher-Singer & Zalmanson, 2013). Furthermore, the freemium model provides possibilities for efficient price discrimination, as conceptualized in the definitions of the freemium business model (Anderson, 2010), and as noted by related research on the aggregation and disaggregation of information goods (Bakos & Brynjolfsson, 2001; Shapiro & Varian, 1999). Whereas single product-single price pricing reaps the same value from all customers or a subscription model collects compensation at timely intervals, the freemium model is able to capture value even from non-paying customers (in the form of increased network effects), as well as by offering different amounts of value matching the individual customer's willingness-to-pay (Hamari & Järvinen, 2011; Wu et al., 2013). A prominent example of the wide spreading freemium model is in the games sector. The freemium model (i.e. the free-to-play business model) has been considered successful especially in the mobile games market (Alha et al., 2014), potentially due to it generating sufficient revenue to cover all costs and also preventing piracy regarding the game products (Messinger et al., 2009).

Perhaps the most notable implication of the freemium business model is the shift in the service design paradigm. Whereas retail and subscription models do not require products and services to entice further payments beyond a flat-fee, services using the freemium model are designed to entice users to make additional purchases. Therefore, the marketing and advertising is no longer mainly targeted to the initial appeal of the service, but rather on service design that attempts to lure users to purchase premium content and additional service (Hamari & Lehdonvirta, 2010; Hamari, Alha et al., 2017; Heimo et al., 2018; Wagner et al., 2014). This setting makes the phenomenon a compelling subject of study, both in the domains of information systems and service marketing.

2.3. Hypothesis development: perceived value in freemium services

The perceived value framework consists of four dimensions of value: emotional value, social value, quality, and economic value. According to perceived value related literature such as the original study by Sweeney and Soutar (2001), these dimensions predict different service/product use-related behaviors relatively well.

Emotional value in the PERVAL-model refers to the affective states and emotions that use of the product or service engenders (Sweeney & Soutar, 2001). In previous literature, this emotional value has often been operationalized as enjoyment, which has also been regarded as the primary driver of use for various hedonically oriented systems (Guo & Barnes, 2011; Van der Heijden, 2004). These hedonic systems (of which games are a prime example) are considered to trigger intrinsic motivations because people engage with them for the sake of entertainment, to enjoy them and to have fun (Deci & Ryan, 1985; Malone, 1981). Ample evidence from the context of entertainment-oriented hedonic systems exists for the positive effect that enjoyment value has on the use of a system (e.g. Hwang, 2005; Hwang & Kim, 2007; Lowry, Gaskin, Twyman, Hammer, & Robers, 2013; Van der Heijden, 2004). Similarly, many studies in the context of games have found that enjoyment is a strong driver for game engagement and playing intentions (Hamari & Keronen, 2017a; Hamari, 2015, 2017b; Koo, 2009; Lee, 2009; Park & Kim, 2013; Yoon, Brittany, & Ryu, 2013).

H1a. Perceived enjoyment is positively associated with the continued use intention.

When considering the freemium pricing model, it is expected that the relationship of enjoyment and continued use intentions would be similar to other entertainment-oriented services also using freemium service contexts. However, the relationship of enjoyment and purchase intention for premium products therein is especially curious, since existing freemium services might intentionally try to lower the enjoyment so as to entice users to purchase content or features which are provided as premium (see Hamari, 2011; Hamari & Lehdonvirta, 2010; Heimo et al., 2018). Thus far, only a few studies have investigated the relationship between the enjoyment of the core service and the purchase behavior for premium content, and the results of these studies are inconclusive. While some studies in freemium contexts (e.g. Guo & Barnes, 2011; Guo & Barnes, 2012: Mäntymäki & Salo, 2011; Mäntymäki & Salo, 2013; Mäntymäki & Salo, 2015) show a small positive association between enjoyment and purchase behavior, several others, both quantitative and qualitative, suggest that enjoying the freely available service might in fact reduce any future willingness to purchase premium content (see Hamari, 2011, 2015; Heimo et al., 2018).

It is arguable that if users already enjoy the service sufficiently and its usage is free of charge, then users will gladly continue to use it. But, at the same time they will be less likely to continue spending money on it, as long as the purchases aren't perceived as necessary. Therefore, we expect there to be a negative association between the enjoyment and purchase intentions when the relationship of enjoyment and use intentions is positively controlled for.

H1b. Perceived enjoyment is negatively associated with the intention to purchase premium content.

Secondly, the social dimension refers to the value derived from the ability of the service or product to enhance the social self-concept of the customer (Sweeney & Soutar, 2001). In other words, the social value consists of the perceptions of how the product or service positively affects one's conception of self, as well as the conceptions that one projects others to have of oneself (see e.g. Belk, 2013; Sánchez-Fernández & Iniesta-Bonillo, 2007). This perspective is closely related to the perception of subjective norms that is commonly used as an operationalization of social values in information systems, as well as in marketing research (see e.g. Ajzen, 1991). As argued before, the importance of social value in services has increased in recent years, since more and more services build strongly upon social features and various kinds of user-generated content (Badrinarayanan, Sierra, & Martin, 2015; Oestreicher-Singer & Zalmanson, 2013). While the mechanics for supporting social values within services can be varied, the more specific socio-psychological processes on which these features are commonly built are, for example, perceptions of relatedness (Deci & Ryan, 1985), social comparison (Festinger, 1954), or reciprocity (Cialdini & Goldstein, 2004; Cialdini, Green, & Rusch, 1992).

H2a. Perceived social value is positively associated with the continued use intention.

Enabling social content (Oestreicher-Singer & Zalmanson, 2013) and harnessing the ensuing network effects (Katz & Shapiro, 1985; Lin & Bhattacherjee, 2008) from the user base has become an important strategy, especially for increasing the premium sales in freemium services. Perceived social value has been shown to be an important determinant for users transferring from freemium to premium. For example, in social networks, social value has been noted to be a strong predictor for the intention to purchase virtual items (Kim et al., 2011) or to pay membership fees (Vock et al., 2013). Furthermore, Oestreicher-Singer and Zalmanson (2013) show that users who participate in the community of the freemium service more actively and intensely are also more likely to convert to paying customers.

However, depending on the context of the freemium service, social value can be derived from different sources. In the context of games, the importance of social value has often been acknowledged (Hamari &

Järvinen, 2011; Huang, Cheng, Huang, & Teng, 2018; Paavilainen et al., 2013; Teng, 2017; Yang & Mai, 2010), and social value may manifest in diverse ways. While many games are inherently social experiences because they are played with others, the social value of these games is also constructed through other means in the given context. Games allow users to show an extended or enhanced self in a digital world (Belk, 2013). As an example, virtual products carry socially constructed meanings and cultural implications similar to items in the offline world, and thus, owning or carrying certain items may affect the perceptions of self-image (Kuo, Wu, & Deng, 2009) either positively or negatively. Therefore, in many games virtual items act as status symbols, and are sought after to increase one's social standing in the game community. Research has shown that virtual items that generate social value can easily be implemented into game mechanics, thus making them the favored premium product for many publishers (Lehdonvirta, 2009; Wu et al., 2013). Hence, attributes that create social value are used more often by game designers (Wu et al., 2013). Accordingly, Guo and Barnes (2009) have shown that social influence is a major driver for purchasing decisions in online games. Similarly, Messinger et al. (2009) have indicated that users of virtual worlds often spend money on items, which enhance their online social experience. Furthermore, social values are seen as an important influence on purchasing decisions, as shown for example by Shang, Chen, and Huang (2012) in the context of virtual worlds and by Hamari (2015) in the context of games. Thus, if users perceive social component of the games they play in as valuable they are likely to spend money to emphasize these effects.

H2b. Perceived social value is positively associated with the intention to purchase premium content.

Thirdly, the PERVAL-model acknowledges the importance of quality or the performance value of the product or service to the customer. In this context, quality refers to the functional value of the product or service and the utility derived from the expected performance (Sweeney & Soutar, 2001).

Providing freemium core services for free easily raises doubts regarding the potential quality of the service. These concerns have been especially apparent in the context of games, where freemium games have been largely considered by players to be of lesser quality (Alha et al., 2014; Lin & Sun, 2011). Thus, the pricing structure may place the service provider in a challenging position in terms of creating a freemium product of sufficient quality to satisfy the customers, yet restricting the quality aspects enough to potentially entice premium purchases. Because freemium services have no entry pricing, switching costs between many freemium titles is practically free. Therefore, freemium game players readily test many different games and stop playing them if the quality is not satisfactory (Alha et al., 2014). The technical quality of games has been shown to have an impact on usage intention in online games (Lin & Bhattacherjee, 2010).

H3a. Perceived quality is positively associated with the continued use intention.

Furthermore, Guo and Barnes (2009); Hamari, Hanner and Koivisto (2017) and Rezaei and Ghodsi (2014) have found support for quality to be an important consideration when related to purchase intentions in online game contexts. On the other hand, freemium service/game developers therefore face a dilemma: The service has to be of a high enough quality to retain players, but still have quality gaps that can be filled with premium additional services (see Pauwels & Weiss, 2008). For example, the perceived fairness of the design can play an important role in games.

H3b. Perceived quality is positively associated with the intention to purchase premium content.

Fourthly, the economic value in the PERVAL-model refers to the perception of the costs related to the service. It refers to how inexpensively or reasonably priced the service is perceived to be (Sweeney & Soutar, 2001). Price has long been considered essential for customer value perceptions, especially in casual discussions (see e.g. Sweeney & Soutar, 2001), but with the widening of the value perspective and the resulting multidimensional scales, the centrality of the economic value has been diminished. Traditionally, the price of products and services is naturally considered as one of the main determinants of customer surplus (Alford & Biswas, 2002). However, freemium services are free of monetary costs and therefore afford a highly intriguing context for studying price-related aspects of customer value experience.

H4a. Perceived economic value is positively associated with the continued use intention.

What is especially striking about the freemium business models is the question of how companies can provide real added value over the free core service, in a way that customers would be willing to spend money on the premium service (see e.g. Oestreicher-Singer & Zalmanson, 2013). Although in the freemium business model the entry pricing is practically zero, it does not imply that use of the service would be completely without cost. The freemium model enables pricing to be more dynamic, and enables the operators to adjust the 'price' of the service according to different users' willingness-to-spend. This is especially the case in freemium games where the premium content is commonly sliced into hundreds of separate purchasable pieces. Such content-slicing leads to a wide array of possible customer behavior patterns, and also an unfixed total price of the service.

Currently there is a dearth of literature examining the perception of economic value in freemium services. However, economic value has been shown to be a significant determinant for purchase intentions in online games for premium content (Chou & Kimsuwan, 2013; Lehdonvirta, 2009; Liu & Shiue, 2014; Wu et al., 2013), although these studies do not account for the value perception of the service as a whole.

H4b. Perceived economic value is negatively associated with the intention to purchase premium content.

One of the main reasons for employing the freemium model is to draw in a large customer base with free entry pricing (Anderson, 2010; Oestreicher-Singer & Zalmanson, 2013). Without strong user acquisition and retention there is no practical likelihood for customers to purchase additional premium products and services. Therefore, continuous use (see e.g. Bhattacherjee, 2001; Chiu & Huang, 2015) of the freemium service is a crucial antecedent for purchasing premium content, and this has also been demonstrated in other literature (Hanner & Zarnekow, 2015; Mäntymäki & Salo, 2011).

H5. Users' continued use intention is positively associated with the intention to purchase premium content.

Fig. 1 depicts the research model and hypotheses of the present study.

3. Methods

3.1. Data

The data was gathered by an online survey through websites and social media pages of three major Finnish, games-related magazines. The link to the survey was posted on the websites and/or on the Facebook pages of the magazines. The link was accompanied in all cases by a short introduction of the research and invitation to participate in the study. All the respondents who entered their contact details at the end of the survey were entered in a prize raffle of 3 video games and 8 movie tickets (à 9.75 €). Before answering the survey the participants have been asked if they are familiar with free-to-play games. If this has been denied, the survey ended and the participant has been removed from the survey. If the participant agreed, s/he has been asked

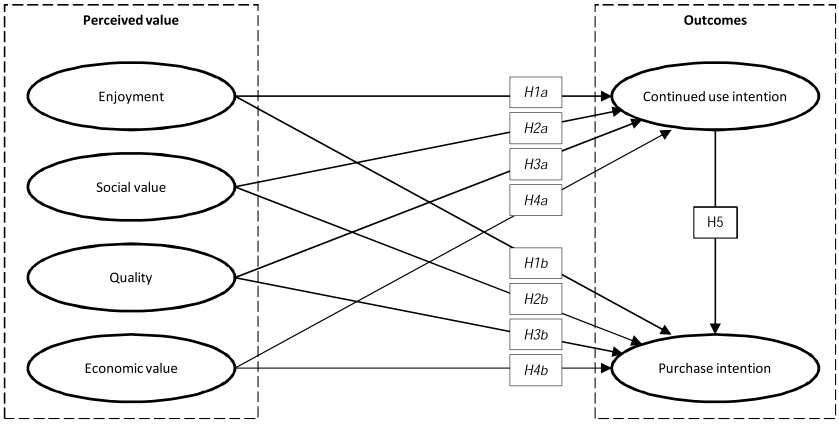

Fig. 1. Research model.

Table 1
Demographic information of respondents, including gender, age, employment, education and income.

Gender	N	%	Education	N	%
Female	79	9,1	No education	13	1,5
Male	786	90,4	Basic education	152	17,5
Other	4	0,5	Secondary level education	449	51,7
			Higher education	255	29,3
Age					
−19	206	23,7	Household income		
20-29	409	47,1	−19 999	359	41,3
30-39	209	24,1	20 000–39 999	198	22,6
40-49	41	4,7	40 000–59 999	150	17,3
50-	4	0,4	60 000–79 999	100	11,5
			80 000–99 999	38	3,3
Employment			100 000–119 999	17	2
Full time employment	245	28,2	120 000–139 999	3	0,3
Part time employment	28	3,2	140 000-	6	0,7
Student	399	45,9			
Unemployed	151	17,4			
Retired	12	1,4			
Other	34	3,9			

about a specific game (their favorite or recently played game) for which s/he would like to answer the questions. Therefore, the participants had a specific game in mind whilst going through the survey. Furthermore, besides demographical data, the participants had to answer, if they have spent money in their specific game. During the timeframe of the survey, 1159 responses were collected. From this sample, 70 cases reported not to have played free-to-play games, and were there-fore removed. For the remaining responses, the data was analyzed for outliers. The outliers were detected by examining the standardized standard deviations of the responses to the psychometric variables. A threshold of 1.5/-1.5 was set for the standardized standard deviation value. All cases that exceeded the threshold were eliminated from the data as outliers. This process resulted in elimination of 124 cases from the data as outliers. Furthermore, two cases were removed due to missing data caused by a coding mistake (possibility of leaving the space empty) in the survey tool. After these omissions, the data contained 869 usable responses. Table 1 outlines the demographic details of the respondents. The gender distribution of the data is unequal, with male respondents representing over 90 % of the sample. This most likely reflects the readership of the channels used for recruiting the respondents, i.e. the social media channels of the major Finnish gaming magazines. Regarding age, most respondents (94,9 %) were under 40 years of age. Of this group, 20–29 year-olds were most heavily represented. The respondents reported to be mostly students. The highest completed level of education revealed that most respondents reported having either a secondary level or higher education. Moreover, given the high percentage of students in the sample, the heavy proportion of respondents who reported their yearly household income to be below 19 999 € is understandable.

The mostly played game platforms are computer/online games and mobile games. These two reflect platforms that have employed the free-to-play very frequently and are also among the most popular game platforms in general. These results are in line with to current market reports on game platforms. Social network/browsers games which also often employ the free-to-play model are not as popular among the participants. This might reflect the scope of the participants but also that the total market share of social network and browser games is lower compared to mobile and computer/online games. The genres show also differences within the participants' preferences. Shooter and RPG are very popular followed by Collectible Card Games (CCG), Combat Builder and Puzzles. This also seem to reflect the generally preferred genres of mobile and computer/online gamers. E.g. very popular genres like MMORPG are reported as online games and RPG and have been frequently named among participants.

3.2. Measurement

The survey consisted of constructs adapted from previously published sources. The independent variables contained constructs related to the PERVAL-instrument: quality, economic value, emotional value (i.e. enjoyment), and social value. The dependent variables measured intentions to continue playing, as well as purchase intentions (Table 2 -

Table 2
Measurement instruments.

Construct	Name	Included / Total items	Adapted from
QUAL	Quality	4 / 4	Sweeney & Soutar, 2001
ECO	Economic value	3 / 3	Sweeney & Soutar, 2001
ENJ	Enjoyment value	4 / 4	Sweeney & Soutar, 2001; Van der Heijden, 2004
SOC	Social value	4 / 4	Ajzen, 1991; Sweeney & Soutar, 2001
CUI	Continued use intention	3 / 3	Bhattacherjee, 2001
PURCH	Purchase intentions	2 / 3	Bhattacherjee, 2001

the constructs and the sources from which they have been adapted).

Furthermore, the constructs used in the instrument consisted of two to four items. All items were measured on a seven-point Likert scale (strongly disagree – strongly agree). The items of the constructs are provided in Appendix A.

The survey was conducted in the Finnish language. Therefore, items adapted from prior research literature were translated from English into Finnish by the authors and checked by a professional translator to verify their correspondence with the original items.

3.3. Validity and reliability

The model testing was conducted with the component-based PLS-SEM in SmartPLS 3. Compared to co-variance-based structural equation methods (CB-SEM), the key advantage of component-based PLS (PLS-SEM) estimation is that it is non-parametric, and therefore makes no restrictive assumptions about the distributions of the data. Secondly, PLS-SEM is considered to be a more suitable method for prediction-oriented studies (such as the present study), while co-variance-based SEM is better suited to testing which models best fit the data (Anderson & Gerbing, 1988; Chin, Marcolin, & Newsted, 2003; Marcoulides, Chin, & Saunders, 2009).

Convergent validity (Table 3) was assessed with three metrics: average variance extracted (AVE), composite reliability (CR), and Cronbach's alpha (Alpha). All of the convergent validity metrics were clearly greater than the thresholds cited in relevant literature: AVE > 0.5, CR > 0.7 (Fornell & Larcker, 1981), and Cronbach's alpha > 0.7 (Nunnally, 1978). There was no missing data, so no imputation methods were used. We can therefore conclude that the convergent requirements of validity and reliability for the model were met.

Discriminant validity was assessed, firstly, through the comparison of the square root of the AVE of each construct to all of the correlations between it and other constructs (see Fornell & Larcker, 1981), where all of the square roots of the AVEs should be greater than any of the correlations between the corresponding construct and another construct (Chin, 1998; Jöreskog & Sörbom, 1996). Secondly, in accordance with the work of Pavlou, Liang, and Xue (2007), we determined that no inter-correlation between constructs was higher than 0.9. Thirdly, we assessed the discriminant validity by confirming that each item had the highest loading with its corresponding construct. All three tests indicated that the discriminant validity and reliability was acceptable.

In addition, in order to reduce the likelihood of common method bias, we randomized the order of the measurement items on the survey to limit the respondent's ability to detect patterns between the items (Cook, Campbell, & Day, 1979). Common method bias refers to a situation where there is "variance that is attributable to the measurement method rather than to the constructs the measures represent" (Podsakoff, Mackenzie, Lee, & Podsakoff, 2003). The sample size (N = 869) satisfies several different criteria for the lower bounds of sample size for PLS-SEM (see e.g. Anderson & Gerbing, 1988; Chin, 1998).

4. Results

All of the results can be seen in Fig. 2 and Table 4. The path model explained 31.3 % of the variance of continued use intentions, and 10.1 % of the variance of intentions to purchase more premium content. The path model gives support for all of the hypotheses set at the outset of the study, except for H3b (and H4b, although the indirect effect for this hypothesis was statistically significant and positive). First of all, our results provide support for the *demand through inconvenience* hypothesis: enjoyment was positively associated with playing intentions (H1a: 0.281***), while at the same it was negatively associated with intentions to purchase more premium content (H1b: -0.226***). Expectedly, social value was positively associated with continued use intentions (H2a: 0.125***) as well as purchase intentions (H2b: 0.107**). Quality was positively associated with purchase intentions (H3a: 0.110***) but there was no significant association with intention to purchase more premium content (H3b: 0.012). As expected, economic value was positively associated with the playing intentions (H4a: 0.139***) but there was no significant direct association with intention to purchase more premium content (H4b: 0.072). Moreover, as expected, playing intentions were positively associated with intentions to use more money (H5: 0.314***).

Table 3
Convergent and discriminant validity.

	AVE	CR	Alpha	ENJ	SOC	QUAL	ECO	PLAY	PURCH
ENJ	0.745	0.921	0.886	0.863					
SOC	0.603	0.859	0.781	0.583	0.777				
QUAL	0.735	0.917	0.880	0.702	0.487	0.857			
ECO	0.650	0.847	0.731	0.645	0.496	0.689	0.806		
CUI	0.740	0.895	0.823	0.521	0.411	0.464	0.458	0.860	
PURCH	0.837	0.911	0.806	0.054	0.145	0.100	0.131	0.278	0.915

In addition to the direct effects, we also investigated the total effects between the independent variables and intentions to purchase more content (direct effect + the effect mediated by playing intentions). The results show that those independent variables that have a positive association with both dependent variables also naturally show a stronger positive total association with intentions to purchase more premium content (Table 4 - right hand columns). An exception in these results is of course the mediated effect of enjoyment, as its association is positive with continued use intentions and negative with purchase intentions. However, we can observe that even the total effect remains significantly negative (−0.138***). Moreover, we found that while the direct association between economic value and purchase intentions was not significant (0.072), the total effect was both positive and significant (0.115**).

5. Discussion

In order to compare the findings of the present study to the findings in the extant corpus on perceived value in the freemium context, we systematically searched all articles on the Scopus platform where the word 'freemium' had appeared in title, abstract or keywords. We then analyzed all papers in this corpus and picked all articles that investigated any kind of consumer value, perceived value, gratification or motivations as well as their relationship with outcome variables related to the use of the freemium service and/or purchasing of premium content. Next, we summarized their results as well as compared the similarities and differences between the findings of the present study and the findings of each prior study (Table 5). It can be concluded that the present paper was perhaps the first study to investigate the coherent core of perceived value constructs as determinants for consumer willingness to use freemium services as well as to purchase premium content in the freemium service. In the extant corpus, several studies have investigated different sets of consumer value dimensions, however, it appears that much of the literature does not paint as coherent picture in the sense that they delve on several layers of abstraction as well as might have lowered coverage of relevant dimensions on the same level of abstraction. While the present study did not venture very deep or to specific levels of consumer value, it did cover all of the relevant dimensions of consumer value in a theoretically-sound manner whereas most studies have investigated only for example the division of hedonic and performance (or price/performance -ratio) of consumer value. The extant corpus (Table 5) has been able to draw some more nuanced observations for example related to the "demand through inconvenience" or as e.g. Mäntymäki et al. (2019) articulate "strategic inconvenience". For example, in the mentioned study, intrusive advertising is investigated as the operationalization of inconvenience. While such operationalization is able to inform about the association of specific inconvenience and its relationship with consumer behavior in

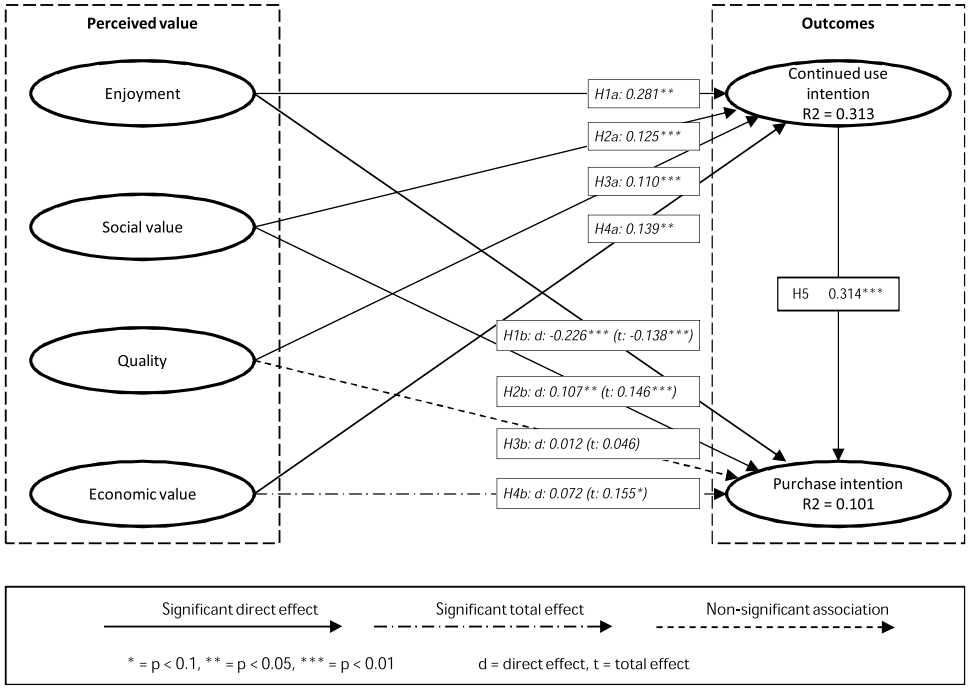

Fig. 2. Results.

freemium services, it is not able to cover all possible forms of inconvenience.

Comparing with specific results in the extant corpus (Table 5), it can be concluded that across the literature, social value has been found the be a positive predictor of purchase intentions for premium content in all literature and the present study with the exception of Mäntymäki et al. (2019). Similarly, economic value has also been established to be a positive determinant of premium purchases, however, in the present study, its positive association was mediated by the willingness to continue the use of the freemium portion of the service. Previous studies (with the exception of Hamari, Hanner and Koivisto, 2017) had not investigated freemium service quality although quality is considered one of the main dimensions of perceived value (Sweeney & Soutar, 2001). Although Hamari et al., (2017) investigated several dimensions of service quality, the general tendency in the findings is similar to the present study in the sense that service quality overall seems to be more strongly associated with intention to use the freemium service compared to willingness to purchase premium content. Finally, and perhaps more interestingly, enjoyment remains yet to be an elusive dimensions consumer value in the case of freemium services. As frequently articulated in the present study, enjoyment seems to have a dual effect on consumer behavior; on one hand it may increase user retention, and on the other, it may reduce user monetization. The more the user is content with the free service, the less they may feel inclined to purchase premium content. However, across the extant studies, there are contradictory results. For example, the finding of Gainsbury, King, Russell, & Delfabbro (2016); Hamari, 2015; Hamari, Alha et al., 2017; support the notion of the negative association whereas studies such as Hamari, Malik, Koski, & Johri (2019); Mäntymäki and Salo (2015) do not show a clear indication one way or the other even though they investigate the relationship and while Mäntymäki et al. (2019) is the only study in this corpus showing a positive association with enjoyment of the service and premium purchase as well as that intrusive advertising would not have an effect on enjoyment.

5.1. Theoretical implications

A theoretically interesting implication of this study was our so

Table 4
Direct and indirect effects.

		H#	Direct effect	Sig.	p	Total effect	Sig.	p-value
Continued use intention (R2 = 0.313)	Enjoyment	H1a	0.281	***	0.000	n/a		
	Social value	H2a	0.125	***	0.001			
	Quality	H3a	0.110	**	0.037			
	Economic value	H4a	0.139	***	0.003			
Purchase intention (R2 = 0.101)	Enjoyment	H1b	−0.226	***	0.000	−0.138	**	0.016
	Social value	H2b	0.107	**	0.011	0.146	***	0.001
	Quality	H3b	0.012		0.827	0.046		0.406
	Economic value	H4b	0.072		0.170	0.115	**	0.029
	Continued use intention	H5	0.314	***	0.000	n/a		

* = p < 0.1, ** = p < 0.05, *** = p < 0.001.

Table 5
Results compared to the extant corpus.

	Context	Independent variables	Dependent variables	Results	Related result in the present study (S = similar result, D = contradictory result)
Beltagui, Schmidt, Candi, and Roberts (2019)	An online game community	Player orientation (achievement, social); sense of community; perceived service performance; community strength	Willingness to pay (WtP)	- Sense of community is positively related to WtP, however, the relationship is moderated by player orientation - Achievement-oriented players with strong connection to the community have higher WtP - Socially oriented players with a strong connection to community have lower WtP - (Dis)satisfaction with the service not related to purchase behavior	- S: Social value positively associated with purchase intention - D: Enjoyment negatively associated with purchase intention
Fang, Zheng, Ye, & Goes, 2019	RoyalSword, a mobile freemium social game released by Tencent	Player ties	Willingness to pay (WtP)	- Player's WtP is positively related to their friends' WtP - The effect of pure friends' WtP is significantly stronger than that of Simmelian-tie friends' (ties between two friends sharing a common friend)	- S: Social value positively associated with purchase intention
Fernandes & Guerra, 2019	On-demand music streaming service	Technicality; perceived usefulness (PU), perceived enjoyment (PE); perceived value (PV); perceived fee (PF)	Purchase intention (PI)	- Perceived technical complexity negatively influences PU and PE, - PU is the main predictor of PV - both PV and PF are significant predictors of PI, but the negative effect of PF is stronger than the positive effect of PV	- (No overlapping path between similar constructs)
Gainsbury et al., 2016	Social casino games	Motivations for paying to play	Use of social casino games	- Increasing the "level of enjoyment", "to take advantage of a special offer", "to get ahead in the game", "impulse decision to continue play", "because the game isn't fun otherwise", "to purchase gifts for friends", and "to avoid waiting for or earning credits" are the most commonly reported reasons for making purchases in social casino games	S: Enjoyment negatively associated with purchase intention
Hamari, 2015	Social virtual world; first-person shooter games; social networking games	Subjective norm; attitude, perceived enjoyment, continuous use intentions	Purchase intentions	- Perceived enjoyment of the game reduces purchase intention, but increases the intention to continue playing - Continued use positively predicts purchase intentions for virtual goods. - Attitude toward virtual goods and subjective norms strongly increase the willingness to purchase virtual goods	S: Enjoyment negatively associated with purchase intention S: Continued use intention positively associated with purchase intention S: Social value positively associated with purchase intention
Hamari, Alha et al., 2017	Free-to-play games	Purchase motivations: Unobstructed play; Social interaction; Competition; Economical rationale; Indulging the children; Unlocking content	In-game purchase activity	- Purchase motivations of un-obstructed play, social interaction and economical rationale are positively associated with how much money the players spend in free-to-play games	- S: Enjoyment/(postulated) inconvenience negatively/positively associated with purchase intention - S: Social value positively associated with purchase intention - S/D: Economic value positively (but indirectly) associated with purchase intention
Hamari, Hanner et al., 2017	Free-to-play games	Service quality (Assurance; empathy; reliability; responsiveness)	Play intention; purchase intention	- Assurance, empathy, reliability, and responsiveness predict play intentions, but not purchase intentions - Reliability has a positive effect on purchase intentions as mediated by playing intention - Play intention predicts purchase intention	S: Quality (overall) positively associated with play intention D: Quality (overall) not associated with purchase intention S: Continued use intention positively associated with purchase intention
Hamari et al., 2019	Pokémon Go	Game enjoyment; outdoor activity; ease of use; challenge; nostalgia; competition; privacy concerns; trendiness	Intention to reuse; In-app purchase intention	- Intention to reuse the game is positively affected by game enjoyment, outdoor activity, ease of use, challenge, and nostalgia - In-app purchase intentions are positively	- S: Enjoyment positively associated with continued use intention - D: Enjoyment negatively associated with purchase intention

(*continued on next page*)

Table 5 (*continued*)

	Context	Independent variables	Dependent variables	Results	Related result in the present study (S = similar result, D = contradictory result)
				affected by outdoor activity, challenge, competition, socializing, nostalgia, and intentions to reuse - Privacy concerns or trendiness are not associated with reuse intentions or in-app purchase intentions - Enjoyment is not associated with in-app purchase intention	- S: Continued use positively associated with purchase intention
Kim, Lee, & Zo, 2018	Freemium software applications: Evernote, a note-taking productive application, and Clash of Clans, a free-to-play game	Satisfaction; User characteristics (Free mentality; Personal innovativeness); Relational characteristics (Usage period; Interpersonal relationship); Marketplace characteristics (Alternative attractiveness; Relative advantage; Switching cost; Value-for-money)	Continuance intention (CI); premium purchase intention (PI)	- Satisfaction positively affects CI, but does not influence PI - Satisfaction indirectly affects PI by interacting with various characteristics - Free mentality has a negative effect on PI, but no effect on CI - Personal innovativeness has a positive effect on CI, but no effect on PI - Usage period has a slight positive influence on CI and a negative influence on PI - Interpersonal relationships has a positive direct and negative moderating effect on CI and PI - Alternative attractiveness has a negative effect on CI but does not affect PI - Relative advantage has a positive effect on PI - Switching cost as a positive effect on CI and PI - Value-for-money has a positive effect on PI	- S: Economical value positively associated with purchase intention - S: Social value positively associated with continued use intention and purchase intention
Mäntymäki & Salo, 2015	Habbo Hotel, social virtual world	Reasons for purchasing	User value created from virtual item and premium account purchases	Benefits of premium account and membership, customization of virtual environment, enjoyment and hedonic outcomes, and status gains inside the virtual environment were the most common reasons given for purchasing actions	- S: Enjoyment (of core experience) negatively associated with purchase intention
Mäntymäki et al., 2019	Spotify	Ubiquity; enjoyment; intrusiveness of advertising; price value; social connectivity; discovery of new content	intention to upgrade to the premium subscription; intention to retain the premium subscription	- Intention to upgrade to premium is predicted by enjoyment and price value of the premium subscription - Intention to retain the premium subscription is predicted by ubiquity and the discovery of new content - Social connectivity is not associated with the intention to upgrade but has a slight negative effect on the intention to retain the premium subscription - Intrusiveness of advertising in the freemium subscription has a negative effect on the perceived price value of the premium subscription.	- D Enjoyment negatively associated with purchase intention - S: Economical value positively associated with purchase intention (indirectly) - D: Social value positively associated with purchase intention
Shi, Xia, & Huang, 2015	Dragon Nest, a freemium social (MMORPG) game	Newness of a Guild member; number of friends; rating assigned to the Guild; length of Guild's existence; the currency a Guild owns; user past performance; number of times that a player makes a positive change in the skill; number of battle winnings over other game Characters; number of the PvE adventure score; PvE and PvP performance	Users' spending amount over time	- Social interaction is an important predictor for spending. Both formal and informal social connections significantly influence users' purchase decisions - New guild members spend significantly more than old members - Users at different hierarchical positions within Guilds vary in terms of spending - Members in the Guild with higher ratings are more likely to purchase - The more friends one player has, the higher the	S: Social value positively associated with purchase intention D: Continued use intention positively associated with purchase intention

(*continued on next page*)

Table 5 (*continued*)

	Context	Independent variables	Dependent variables	Results	Related result in the present study (S = similar result, D = contradictory result)
		records' interaction with Guild membership; play time		spending - Performance records exert a significant effect on purchase behavior - Game-play time does not significantly affect cash spending	
Wagner et al., 2014	Music as a service -services	Perceived price value; perceived equivalence of free and premium versions' functionalities (perceived premium fit); cognitions about the premium version; attitude toward the free; attitude toward the premium	Intention to pay	- Attitude toward the free service is positively related to cognitions about premium, but has no effect on attitude toward premium service - Cognition about premium shows a highly significant influence on attitude toward premium - Attitude toward premium is positively related to intention to pay for the service - Perceived premium fit influences attitude toward free service positively - Perceived price value has the strongest effect on cognitions about premium	(No overlapping relationships between similar constructs).

called *"demand through inconvenience"* hypothesis. It suggests that the more enjoyable the users perceive a freemium service to be, the more they are willing to use it, *however*, the less they are willing to purchase premium content. What makes this phenomenon likely to exist in the context of freemium services is that the core idea of the freemium business model is often to impair the use of the free service through designed inconveniences, i.e. to reduce the enjoyment in order to entice users to purchase premium services or features that eliminate the obstacles of the freemium version (Hamari, 2015; Mäntymäki et al., 2019; Wagner et al., 2014). Therefore, in order for the customers to have a demand for these premium services, they first have to feel negatively about the limitations of the freemium version. Conversely, customers who simply enjoy the freemium service enough might not feel the urge to purchase the premium features. In other words, we hypothesized that the frustration and inconveniences of the freemium service make the customer more likely to purchase premium content as long as they are still willing to use the service. This observation highlights the dual nature of goals that a provider of a freemium service may have in terms of consumer perceived value of the service and their willingness to continue using the service and purchase premium content. As seen in the comparisons made in Table 5, observations that support this view have been made in past studies.

If we consider the basic tenets of information system design as well as value creation in general, then our findings offer intuitively surprising but understandable new insights. In a traditional business understanding (for retail as well as subscription models), a company attempts to maximize the positive value propositions of a product or a service in order to maximize sales and use of the product/service (Rust & Kannan, 2003). In the freemium business model however, the situation seems to be more complex. Freemium businesses attempt to maximize the positive value propositions of a product or service similar to classical businesses, in order to acquire and retain customers. However, in order to cross-sell premium products, the companies may seek to intentionally inconvenience their customers. Hence, freemium service providers try to find an equilibrium between enough positive value propositions to retain the customer, and an acceptable level of negative value (such as inconvenience) so as to convert people into paying customers. Our results lend support to these observations via the negative association which was found between enjoyment of the service and the purchase intentions for the premium products.

Comparably, we hypothesized that quality could have a similar impact. We found that the quality of the freemium service positively predicts the willingness to use it further, but no relationship between quality and purchase intentions for premium products was found. The relationship between quality, the technical functionality and reliability of the service, and the willingness to use the service is rather evident, as with all other services, any quality impairments are likely to decrease future use intentions. However, compared to the significant indirect effect of economic value on purchases of premium content, no similar effect was found for quality. We propose that this may be related to the way in which freemium services are designed. The core service provides the essential quality attributes (such as stability and general technical quality) that form the foundation of the service. As these quality aspects are crucial for the service to function in the first place (even on the freemium level), they are commonly well executed in the free core of the service, and therefore the operators do not sell them as further premium content. Thus, users might not consider the quality dimension in their purchase intention. Moreover, this might be intensified in games where premium offers are strongly associated with game progress, social interaction, player performance, or aesthetic and visual aspects. In this context, this divergence seems strong enough to diminish the total effect of quality and usage intention in regard to purchase intention. This is also indicated by the fact that quality had the weakest impact of all the perceived value dimensions on continued use intention. In the games industry setting, Gretz and Basuroy (2013) have presented similar results where quality might have a less important

influence on purchase intention (as other factors play a more important role).

In traditional marketing understanding, price has been considered as the main determinant of successfulness of marketing, in addition to product, place and promotion. It is also considered as an important strategic aspect of product positioning and competitive advantage (Kotler, 1972; Noble & Gruca, 1999; Van Waterschoot & Van den Bulte, 1992). Compared to non-freemium services, freemium services and free-to-play have the competitive advantage of low or non-existent entry pricing, as well as the free core of the service. However, freemium services also consist of purchasable premium content, and therefore the freeness of the core service does not reflect the overall cost of the service. Our results indicate that the perceived economic value of the freemium service as a whole has a positive effect on the intention to use the service, but no direct effect on the willingness to buy more premium content. An explanation for this lack of effect could be that consumers evaluate the economical value to be unrealistically high, since they potentially focus too heavily on the notion of the freeness of the entry cost and less on the possible costs related to the additional premium services. In fact, freemium developers sometimes rely on this consumer bias and consider that the free entry pricing tends to make consumers blind to the overall costs that are incurred only after the users have started to use the service. This may also be related to the hyperbolic discounting bias, where negative outcomes are undervalued/downplayed when the expectation is that they will be incurred later (Ainslie, 1975), and only if the user purchases premium content. If this interpretation holds true, it might explain our results as even those consumers who assess the economic value to be high may only be able to evaluate the entry price, rather than the broader holistic costs. Therefore, even those consumers who perceive the economic value of a service to be high, still might not be any more likely to purchase premium content.

In this study, social value was a significant determinant for freemium service use and for premium content purchases. These results are consistent with our hypotheses (H2a, H2b) and concur with prior research that has found similar outcomes for freemium services (e.g. Oestreicher-Singer & Zalmanson, 2013; Vock et al., 2013). As hypothesized, especially in the context of free-to-play, games are often designed to draw heavily on social influence and social sharing. Moreover, the premium content commonly contains items or features that increase the social value of the service, and which further translates into a willingness to make purchases. Therefore, the findings regarding the relationship of social value and use, as well as purchase intentions are as we expected.

5.2. Practical implications

The recent popularity of the freemium business model can be related to the unique way in which it enables the cross-selling of premium content through marketing activities within the service. It allows improved user acquisition by offering the core service for free. The large user base can then be converted to paying customers within the service (Oestreicher-Singer & Zalmanson, 2013). The fact that the demand for premium content is created within the service, firstly makes it easier to expose customers to demand-creating marketing activities, and secondly, these activities can be better controlled and managed through service design.

Overall, our results highlight the importance of demand creating mechanisms for freemium services and their inherent integration into the service design. Logically, service providers that either offer most of their services for free or do not create a demand for premium offers within the service, will suffer from low conversion rates of their free-use customers into paying users. Yet, this does not imply that converting freemium users into paying customers might be easily accomplished, simply by reducing the freely available service features. Managers should carefully assess what parts of the service design enable demand creation, and what mechanisms work counterproductively in this regard. Furthermore, since service design and demand creation are inherently intertwined, their potential mechanisms should be considered in early stages of the service development. Deploying them into running services may be difficult and might not result in the desired outcome, given that later deployment may not make full use of the existing structures and mechanics of the service design, and also that these elements can prevent a smooth integration of additional features. Games have been forerunners of freemium business design where the balance between the core free service offering and premium purchasable parts has been taken to extremes sometimes, even to the extent that has lead to unethical business practices (Heimo et al., 2018) and user churn. Therefore, for sustainable business practice it would be advisable to refrain from employing 'dark patterns' (Zagal et al., 2013), intrusive marketing (Mäntymäki et al., 2019), "gamblification" (Macey & Hamari, 2019) or creating situations for the user in which they would feel extorted (Hamari & Lehdonvirta, 2010) to lose acquired assets within the service.

In freemium services (and especially in free-to-play games), the enjoyment derived from the service often seems to be intentionally reduced by the developers to create a demand for premium products. One of the common mechanisms for demand creation in freemium services is by restricting the access to certain content. Common types of limited content are storage space, service functionalities, or usage capacity. In the free-to-play context, the content may be additional levels, special items, or resources. In free-to-play games, the opportunity of unlocking game content often exists, even for freemium users. However, it might require extensive amounts of playtime to reach certain conditions in the game that enable unlocking, thus potentially causing frustration and an evident delay in game progress. This resulting "frustration" may then, according to our hypothesis, create a demand for premium content which addresses the issue.

Other freemium services also use this mechanism, for instance in the business models of popular cloud storage services such as Dropbox. The Dropbox service initially offers a limited amount of free storage space to its users. Users can "gain" more storage by completing small challenges (e.g. completing the tutorial, inviting a friend, or connecting a smartphone). However, after completing the challenges, more storage space can only be purchased as a premium product, or the free progress is slowed down because e.g. it becomes harder to find more friends to invite. When the free space is consumed, the customer is inconvenienced as further usage is limited (but not impossible) because of the lack of storage space. This may then create a willingness to purchase the premium version of the service. However, no other features of the service are limited and the continued use of the existing storage space is still possible.

The results of this study explain the logic for these types of service design decisions. As all aspects investigated in the study (quality, economical value, social value and enjoyment) lead to higher usage intention, it is important that the service design actually allows users to become and remain engaged with the service. Therefore, we seek to highlight the importance of well-executed and balanced design of the free core service. An imbalance of freemium and premium within a service design further offers one potential explanation for the failure of freemium services. Very limited free core services or aggressive monetization strategies can prevent users from becoming engaged, and instead of taking advantage of premium offers, users may seek better and free alternatives. This is especially important since even the non-paying users positively affect the network effects of a service and help the service reach 'critical mass' (Hamari & Järvinen, 2011; Oestreicher-Singer & Zalmanson, 2013; Wu et al., 2013).

While many freemium services specifically rely on user-generated and social content created by the community (see e.g. Oestreicher-Singer & Zalmanson, 2013), all types of freemium services can take advantage of the social influence and potential network effects created through various social features. For instance, by enabling the social sharing of activities and progress in the freemium service or in

aggregated social networking services, the service provider may enable social comparison and competition between users. These are commonly used features in freemium games, and following the progress of other players in a game may motivate the user to continue playing, and also to spend money in order to proceed and keep up with fellow players. Furthermore, social influence may be harnessed in freemium services through processes of personalization or customization. In free-to-play games, these aspects are often implemented as premium content in the form of virtual items which may increase the social status of the owner. In other types of freemium services, personalization and customization could mean, for instance, improved options and features for creating one's profile or for connecting with other users. In conclusion, the means used to support the user's perceptions of the social value of the service can be varied. However, through consideration of how the specific freemium service can support the improvement of self-image for their users and by implementing a suitable set of social features, freemium service providers may increase the user's willingness to use the service and purchase premium content.

Another interesting aspect of this study stems from the relationship between economical value and purchase intention. The result of our model indicates that the economical value of the total sum of premium products a user purchases plus the economical value of the free core service, might be evaluated differently if compared to single premium purchases. We observed that free-to-play games tend to slice their premium offers into rather small (micropayment) parts. Therefore, the strategy could be that even though a single purchase might seem economic, the total amount a user spends might be more than s/he perceives. This approach allows providers to sell more premium content. In other types of freemium services, there are few examples of providing premium content in this manner. A potential reason is that many freemium services do not contain small items or features that could be separately monetized, as is often the case in free-to-play games. However, finding a way to gradually split service features into meaningful parts and sell them separately in other types of freemium services could potentially steer customers to evaluate the economical value of a service under the same conditions that we have proposed for games.

5.3. Limitations and future research avenues

Naturally, there are limitations which should be taken into account. Firstly, while free-to-play games are most likely the largest form of freemium services, results may slightly vary in other kinds of service contexts. Secondly, in our data set over 90 % of the respondents were male, the respondents tended to be young (more than 50 % of the respondents were less than 30 years old), and almost half of the respondents were students with a relatedly relatively low income. The respondent characteristics are most likely connected to the chosen distribution channels of our study (gaming-related magazine social media channels), which mainly attract young males as their readers. However, we can be rather confident that these biases in our data have had little effect on the results.

In this study, we have been limited to cross-sectional survey data as there was no access to behavioral data. We acknowledge that behavioral data would be important and would greatly enhance the research related to measuring customer behavior compared with using measures of intention. The data collection of the present study was conducted via an online survey and the respondents were obviously self-selected. Even though the data collection methods are commonly used and the process followed standard procedures used in the field of social sciences, the effects of these methods need to be noted. The survey invitation was distributed via the social media channels of gaming magazines, which are most likely frequented by game-enthusiasts and people interested in games. As such, it is possible that the respondents who chose to participate in the study are more highly motivated gamers than the average population. Moreover, it is possible that some participants have mainly taken part in the study due to the prize raffle. While we do not consider these factors to have considerably affected the study, they should be however be acknowledged when evaluating the results.

Thus far, only limited research has been conducted regarding the freemium business model. Therefore, various avenues for future research can be identified. Firstly, in order to better understand the freemium business model and the effects of design choices, comparisons between different forms of premium products and users' value perceptions, as well as the effects of these perceptions on use and purchase intentions would yield valuable information for the future design of freemium services. Secondly, as our study is the first to examine the perceived value approach in free-to-play games, we would like to encourage a deepening of the understanding of this perspective. Especially in a gaming context, exploring the mediating effects of personality differences, player types and play styles between perceived value dimensions, and use and purchase intentions could yield interesting insights for the design of freemium services. This perspective would also contribute a better understanding of the segmentation of users of freemium services. An interesting question which arises, is for example how the amount of money or hours spent in a service affects the value perceptions of the user.

The freemium model has gained a lot of attention in the media, and opinions on its use are varied. Therefore studying attitudes towards this business model could provide interesting insights. Negative or positive attitudes towards the model in general could potentially mediate the relationship between the perceived value dimensions, as well as use and purchase intentions.

Furthermore, as a major strength of the freemium business model is its ability to attract new subscribers, then another avenue of future research could focus on the pre-adoption perceptions of users. The model in this paper includes aspects that require an initial contact to be established between users and the service, prior to any evaluation being made. However, we propose looking deeper into aspects that users can assess before they start using the service, and examining these perceptions could result in a better understanding of how freemium services attract potential customers.

6. Conclusion

In this study, we focused particularly on the prominent question of freemium business about how the perceived value (enjoyment, social value, perceived quality and economic value) are associated with people's willingness to use more of the service, as well as to purchase premium content. To validate our hypotheses, player responses regarding free-to-play games (N = 869) were gathered through an online survey. By analyzing existing literature on these variables, we hypothesized that in freemium services there could be a negative relationship between the purchase intention and enjoyment as well as quality, since a perfect free service would not be able to generate demand for premium content. Indeed, we found support for this "*demand through inconvenience*" hypothesis proposed in this study, indicating that the more enjoyable the players perceive the service to be, the more they are willing to use it, however, the less they are willing to purchase premium content. Secondly, as expected, social value was found to be positively associated with purchasing game content. Thirdly, the quality of the freemium service interestingly does not seem to be associated with purchase intentions. Fourthly, the economical value of the freemium service did indeed have a positive association with the intention to continue using the freemium service, but it had no direct association with intentions to purchase premium content. The economical value only had an indirect association with purchases through the increased willingness to continue using the freemium service.

Author statement

Conceptualization	Hamari, Hanner, Koivisto
Methodology	Hamari
Software	–
Validation	Hamari, Hanner
Formal analysis	Hamari, Hanner
Investigation	Hamari, Koivisto
Resources	–
Data Curation	Hamari, Koivisto
Writing - Original Draft	Hamari, Hanner, Koivisto
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Appendix A Measurement instrument

Construct	Item name	Remark	Item	Source
Purchase intentions	PURCH1		I predict that I will use money in the game in the future at least as much as I have used lately.	Bhattacherjee, 2001
	PURCH2		I intend to use money in the game at least as often within the next month as I have previously used.	
	PURCH3	Omitted	I plan to use money in the game during the next month	
Continued use intention	CUI1		I predict that I will keep playing the game in the future at least as much as I have played it lately.	Bhattacherjee, 2001
	CUI2		I intend to play the game at least as often within the next month as I have previously played it.	
	CUI3		I plan to play the game during the next month	
Enjoyment	ENJ1		Playing the game is enjoyable.	Sweeney & Soutar, 2001; Van der Heijden, 2004
	ENJ2		Playing the game is pleasant.	
	ENJ3		Playing the game is exciting.	
	ENJ4		Playing the game is interesting.	
Social value	SOC1		People who I appreciate like playing the game.	Ajzen, 1991; Sweeney & Soutar, 2001
	SOC2		My friends would think playing the game is a good idea.	
	SOC3		Playing the game improves the way I am perceived.	
	SOC4		Playing the game makes a good impression on other people.	
Quality	QUAL1		The game is of good quality.	Sweeney & Soutar, 2001
	QUAL2		The game is well made.	
	QUAL3		I believe that the game works reliably.	
	QUAL4		I think that the game works as I expect it to.	
Economic value	ECO1		All in all, the game offers value for money.	Sweeney & Soutar, 2001
	ECO2		All in all, the game is a good product/service for the price.	
	ECO3		All in all, the game is cheap.	
	ECO4	Omitted	All in all, the game is expensive. (*reversed)*	

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