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Title: Willingness to pay for freemium services : Addressing the differences between monetization strategies

Year: 2024

Version: Published version

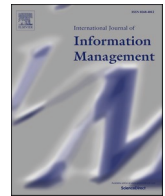
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Please cite the original version:

Tyrväinen, O., & Karjaluoto, H. (2024). Willingness to pay for freemium services : Addressing the differences between monetization strategies. *International Journal of Information Management*, 77, Article 102787. <https://doi.org/10.1016/j.ijinfomgt.2024.102787>



Research Article

Willingness to pay for freemium services: Addressing the differences between monetization strategies

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ARTICLE INFO

Keywords:

Freemium
Online service
Business model
Monetization strategy
Willingness to pay
Mixed-method

ABSTRACT

Freemium business models are a potential monetization strategy wherein companies can persuade consumers to buy premium services by offering a free version with limited functionalities and then benefitting by selling a premium version of the online service. Our empirical investigation followed a mixed-method approach and used meta-analytical data from 55 studies and 15 qualitative interviews. Based on these studies and interviews, we identify key factors influencing consumers' willingness to pay for freemium services. Additionally, we test moderating effects across different monetization strategies (limited features vs. selling virtual items). The results reveal that the dimensions of perceived value (i.e., functional, hedonic, social, and price value), based on a free version of the service, serve as predictors for willingness to pay for freemium services. Trust in the service provider mediates the effects of dimensions of perceived value on willingness to pay for freemium services. The results also show that these relationships are influenced by the monetization strategy. This study contributes to existing literature by consolidating empirical evidence and offering valuable insights regarding willingness to pay for freemium services. The findings have implications for managers, helping them tailor their monetization strategies based on the type of freemium service.

1. Introduction

The freemium concept—referring to a business model where the core service is free and sales are generated through additional premium products or features—was first introduced in the 1980s (Hamari et al., 2020; Wagner et al., 2014). Later, freemium models have been adopted in several contexts, such as music streaming (Spotify), cloud storage (Dropbox), gaming (Pokémon Go), and social media (LinkedIn) (Hamari et al., 2019; Trenz et al., 2019; Wagner et al., 2014; Vock et al., 2013). The emergence of freemium business models has reshaped the monetization of online services. Typically, in the freemium models, a basic version of the service with fewer functions is available for free, and consumers pay for upgraded premium services (Ritzer & Jurgenson, 2010). Another monetization form is selling virtual items, such as coins and gems, clothes for an avatar, or furniture for a virtual room (Meng et al., 2021; Mäntymäki & Salo, 2015; Rietveild & Ploog, 2022). The freemium model can help firms attract potential customers to their services without massive investments in marketing (Kumar, 2014). However, because the success of the freemium business model is dependent on purchases, the experience with the freemium service is

critical (Gu et al., 2018).

The rise of digital platforms has created new challenges and opportunities for companies as service industries continue to shift online (Shah & Murthi, 2021). As a relatively new area of research, there is no consensus on what motivates consumers to pay for freemium services, which hinders the successful implementation of a freemium strategy (Huang, 2016). Thus, it is unclear how the perceptions of the value of a free version of a service influences willingness to pay (WTP). The research field is not unanimous regarding the impact of perceived value on WTP as results concerning the impact are mixed. Studies have identified both positive and negative effects of perceived value on WTP. First, Mäntymäki and Salo (2013) found significant effects of functionality on WTP, whereas this path was non-significant in a study by Hamari et al. (2020). Second, Mäntymäki and Salo (2013) and Mäntymäki et al. (2020) reported the positive effects of hedonic value on WTP, contrary to the negative effects observed by Hamari (2015) and Hamari et al. (2020). Third, both the significant effects of social value on WTP (Hamari, 2015; Hamari et al., 2020) and non-significant effects of social value on WTP (Mäntymäki & Salo, 2013) have been presented in prior studies. The opportunity for research lies in specifically focusing

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<https://doi.org/10.1016/j.ijinfomgt.2024.102787>

Received 28 June 2023; Received in revised form 4 April 2024; Accepted 5 April 2024

Available online 18 April 2024

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on clarifying these results and consequently increasing understanding related to the effects of different dimensions of perceived value on WTP. This will help freemium service providers to design the free versions in a way that increases the conversion rate to the premium version.

The freemium business model allows users to familiarize themselves with the service and reduce uncertainty about it (Luo et al., 2022; Ritzer & Jurgenson, 2010). As a result, the free version helps consumers better recognize the potential value that the service can provide. Drawing on trust theory based on self-perception (Doney et al., 1998), we argue that consumers' experience with the freemium version increases their trust in the service provider, potentially leading to the purchase of chargeable features. By clarifying the role of trust, this study contributes to the related literature by providing a more inclusive understanding of the mechanism behind the success of the freemium business model. From the perspective of service providers, recognizing the importance of trust helps in understanding the role of the free version in the process of converting users of free versions into premium users.

Research on freemium business models can be divided into studies addressing services with limits on features removed in the premium version (e.g., unlimited usage hours, offline access to the service) and studies addressing services focused on selling virtual items (e.g., clothes for an avatar, furniture for a virtual room) (Mäntymäki & Salo, 2015; Wagner et al., 2014). To the authors' best knowledge, this is the first attempt to compare these two monetization strategies for freemium services. This article clarifies the reasons behind the contradictory findings regarding the effects of perceived value on WTP (Hamari, 2015; Hamari et al., 2020; Mäntymäki & Salo, 2013; Mäntymäki et al., 2020). Understanding the impact of the dimensions of perceived value on WTP across different monetization strategies allows service providers to identify effective ways to generate revenue from freemium services. Therefore, this study can inform decisions regarding monetization strategies.

As discussed, previous research lacks a clear consensus regarding the impact of the dimensions of perceived value, the mediating role of trust, and the influence of different monetization strategies on the effects of perceived value. Thus, we address the monetization of freemium business from the consumers' perspective with the following research questions:

1. What are the impacts of the dimensions of perceived value on WTP?
2. How does trust in the service provider mediate the relationship between perceived value and WTP?
3. How does the impact of perceived value on WTP differ in different monetization strategies for freemium services?

To answer these research questions, this research uses a mixed-method approach. First, we conduct a quantitative meta-analytical study that allows us to integrate results from previous studies and compare research findings across the two monetization strategies introduced above. Second, we perform a qualitative study based on semi-structured consumer interviews that allow us to deepen the understanding of our meta-analytical findings.

The rest of the article is organized as follows. First, we present the conceptual foundation and the key constructs of this article. Second, we describe the research design of Studies 1 and 2. Third, we present the meta-analytical Study 1. Fourth, we present the exploratory qualitative Study 2. Fifth, we discuss theoretical and managerial implications, as well as limitations and potential future research directions raised by this study.

2. Literature review

2.1. Understanding the freemium business model from the perspective of trust theory based on self-perception

Trust theory based on self-perception refers to a process wherein trust is

formed based on the direct experience with an exchange partner (Kim, 2008). This evaluation of the exchange partner decreases uncertainty related to the partner's performance. Supporting this view, it has been shown that the level of trust increases as consumers gain knowledge of a service, which can be turned into loyalty (Dagger & O'Brien, 2010). Therefore, customers are more likely to continue a relationship if they trust the exchange partner. In the context of freemium services, we argue that trust in the service provider is derived from knowledge gained by using the free version, which reduces uncertainty regarding the premium service.

The freemium business strategy is based on providing something for free and then encouraging users to pay for premium features (Sciglimpaglia & Raafat, 2022). From the consumers' perspective, the freemium model allows them to familiarize themselves with the service without the risk of financial loss (Ritzer & Jurgenson, 2010). Thus, the key to this business model lies in convincing consumers of the benefits of the premium version through their use of the free version. The free version can significantly reduce consumer uncertainty about the service (Luo et al., 2022). However, conflicting findings regarding the effects of perceived value on WTP have been presented. Even though companies can effectively present the benefits of the service with the free version, several studies have found negative effects of the relationships between dimensions of perceived value and WTP. For example, Hamari et al. (2020) observed a negative effect for hedonic value and a non-significant effect for quality. A similar impact indicating the negative effect of hedonic value on WTP was presented by Hamari (2015).

Drawing on trust theory based on self-perception, we argue that trust in the service provider plays an important role as a mediator between perceived value and WTP as, in this context, trust in a premium service is based on experience with a free version of the service. As the success of the freemium model is based on increased knowledge of the service through use of the free version, the perceived value of the free version is key in motivating users to upgrade to the premium version. Researchers have shown that increased knowledge is associated with a higher level of trust in the service and greater loyalty (Chiou et al., 2002; Eisingerich & Bell, 2008). As per Eisingerich and Bell (2008), service quality is positively linked to trust, and consequently, increased service knowledge enhances trust perceptions. Similarly, Chiou et al. (2002) showed that service quality increases trust in the service provider, which results in loyalty. In a summary, we argue that perceived value increases trust in the service provider, which increases WTP.

2.2. Monetization strategy: features versus products

Monetization strategy refers to "the way the company makes money from the value offering through a variety of revenue flows and their overall profitability" (Holm & Günzel-Jensen, 2017, p. 17). Two monetization strategies for the freemium business model have been recognized in prior literature: limiting features in the free version and selling virtual items (Hamari & Keronen, 2017; Hamari et al., 2020; Sciglimpaglia & Raafat, 2022; Lee & Tan, 2013). The strategy of limiting features is related to offering a product with restricted functions or limited usage time (Sciglimpaglia & Raafat, 2022). In this monetization model, a limited version of the service is offered for free, with the option to pay for the service with premium features. The strategy of limiting features is used in several online services, such as Dropbox, LinkedIn, and Spotify (Trenz et al., 2019; Wagner et al., 2014; Vock et al., 2013). In cloud storage, a free account is offered with limited storage size and a premium version is offered with more capacity (Trenz et al., 2019). For music streaming services, service providers can limit time of music consumption or add advertisements for users of the free version. In the social media context, service providers often limit possibilities for interaction for users of the free version (Vock et al., 2013). The strategy of selling virtual items refers to the sale of virtual items alongside the free core service (Hamari et al., 2020; Meng et al., 2021). For example, users might purchase clothes for their avatar or furniture for their virtual

room (Mäntymäki & Salo, 2015; Rietveild & Ploog, 2022).

We argue that these two monetization strategies differ fundamentally in terms of the nature of the product sold. Sales of virtual items are often sliced into several transactions (Hamari et al., 2020), whereas services using the “limited features” model are typically purchased once. Thus, the decision-making behind these strategies may differ. Since the free version of a service allows users to familiarize themselves with the service, it facilitates understanding the value of the service. However, the effects of perceived value on WTP may differ across monetization strategies. As Table 1 illustrates, previous studies have adopted several theoretical lenses and various factors behind the WTP for freemium services. As discussed earlier, the results regarding the predictors of WTP for freemium services are mixed. We argue that these findings might be a result of the impact of the different monetization strategies of the freemium services studied. As studies conducted in different contexts may produce mixed findings, addressing the moderating impact of the monetization strategy helps in understanding the impact of perceived value across services.

3. Research design

The purpose of this research is to understand how the perceived value of the free version of a service in freemium services transforms to WTP for its premium services. Therefore, we employ a mixed-method approach that builds on both quantitative and qualitative methods. The objective for this approach is to identify the factors that are driving consumers’ WTP for freemium services across different freemium monetization strategies. More specifically, in Study 1 we used multi-group analysis in meta-analytical structural equation modeling (MASEM) to quantitatively test the differences between monetization strategies. The conceptual framework used in Study 1 builds on factors that have been recurrently noted in prior literature. The understanding of the findings of Study 1 were deepened by the qualitative consumer interviews in Study 2. Thus, the interview questions were driven by the results of the quantitative study. Through the semi-structured interviews, we are able to generate deep insights into the differences between the perceived value related to the two different monetization strategies and its relationship with perceptions of the service provider and WTP for freemium services. In addition, these findings allow us draw up a future research agenda.

4. Study 1: meta-analysis and MASEM

4.1. Overview

The purpose of this study is to synthesize prior research related to freemium services and test the differences across monetization strategies. Thus, a meta-analysis of 55 studies was conducted. We use multi-group analysis in MASEM to test our conceptual framework (see Fig. 1). More specifically, we address the differences of the predictors of WTP for freemium services across the two monetization strategies (limited features vs. selling virtual items).

4.2. The conceptual framework and hypotheses development

The conceptual framework of this meta-analysis is presented in Fig. 1. WTP represents its focal construct and its relationships with the perceived value of the free version and trust in the service provider serve as the objects of interest. The four dimensions of perceived value (functional value, hedonic value, social value, and price value) are based on the framework of Sweeney and Soutar (2001). In line with previous studies, we address the direct impact of perceived value on WTP (Hamari et al., 2020; Vock et al., 2013). In addition, we address the mediating effects of trust on this relationship according to trust theory based on self-perception (Kim, 2008). We compare these effects according to the moderating effects of the monetization strategy (limited

Table 1
Key studies addressing the willingness to pay for freemium services.

Authors	Methodology	Theory/model	Findings
Hamari (2015)	A survey of 2791 players of freemium games	The theory of reasoned action	Enjoyment was found to decrease the willingness to buy virtual items, but increased willingness to play. Willingness to play was positively linked with willingness to buy virtual items.
Hamari et al. (2020)	A survey of 869 players of freemium games	The perceived value framework	Enjoyment was found to decrease intention to in-game purchases but increase usage intention in regard to the service. Social value increased both intention to purchase and intention to use. Quality of service was not found to increase purchase intentions but was positively linked with usage intention in regard to the service. Economic value increased both the use of the service and purchase intentions.
Hamari & Keronen (2017)	A meta-analysis of 24 studies addressing freemium games	-	Service design was found to affect the purchasing of virtual items. More specifically, network effects, self-presentation, enjoyment, ease of use, flow and use of the platform were found to predict purchasing behavior. Online self-presentation and self-efficacy, VC involvement, and self-presentation norms all affected purchase intention in regard to virtual items.
Kim et al. (2012)	Surveys of 217 and 197 users of virtual worlds	The theory of self-presentation	Online self-presentation and self-efficacy, VC involvement, and self-presentation norms all affected purchase intention in regard to virtual items.
Mäntymäki & Salo (2011)	A survey of 2481 users of a virtual world	The technology acceptance model	The continuous use of service, the presence of other users, enjoyment, and usefulness were found to affect the purchasing of virtual items
Mäntymäki & Salo (2013)	A survey of 1045 users of a virtual world	The unified theory of acceptance and the use of technology	Purchasing virtual items was a result of efforts to enhance the user experience. More specifically, network size and motivational factors influenced these intentions.
Mäntymäki & Salo (2015)	A survey of 1604 users of a virtual world	The theory of consumption values and developmental psychology	Purchasing virtual items was found to be explained by the benefits of a

(continued on next page)

Table 1 (continued)

Authors	Methodology	Theory/model	Findings
Vock et al. (2013)	Surveys of 5738 and 462 users of social networking sites	Entitativity theory, social capital theory	premium user account, decoration, status, and enjoyment of the user experience. Willingness to pay for premium features was affected by entitativity and social capital. The effects of economic value and social value were dependent of the type of membership and type of social network.
Wagner et al. (2014)	A survey of 317 users of music streaming services	The elaboration likelihood model	A functional fit between free and premium services increases the intention to pay for premium features.

features vs. selling virtual items).

4.3. The determinants of WTP

4.3.1. Trust in the service provider

Moorman et al., (1992, p. 315) defined *trust* as “a willingness to rely on an exchange partner in whom one has confidence.” In research, trust is identified as a key mediator that explains the effects of knowledge of services and purchase intention (Doney et al., 1998; Makmor et al., 2018; Morgan & Hunt, 1994). As knowledge of a service increases, uncertainty related to the service decreases, which may increase trust (Doney et al., 1998). Limited trust in a freemium service provider is associated with higher risk related to premium purchases and thus to negative WTP (Vock et al., 2013). In freemium services with limited features, users have already tested the service, which reduces uncertainty. For services focusing on selling virtual items, it might be more difficult to evaluate the product before the purchase. Thus, the level of uncertainty related to the purchase of virtual items is higher than the level of uncertainty involved in the purchase of services removing limits on features. Consequently, we expect that trust in a service provider is positively related to WTP, and the importance of trust might be stronger in the case of virtual items. Based on the above discussion, we hypothesize the following:

H1. The impact of trust on WTP is stronger for the “virtual items”

monetization strategy than it is for the “limited features” monetization strategy.

4.3.2. Perceived value based on a free version

The definition of *perceived value* has been a topic of debate among researchers as there is disagreement regarding the dimensionality of *value* (Sánchez-Fernández & Iniesta-Bonillo, 2007). The unidimensional research stream defines *perceived value* as “the consumer’s overall assessment of the utility of a product based on perceptions of what is received and what is given” (Zeithaml, 1988, p. 14). This perspective is widely criticized as narrow as it only considers the relationship between benefit and sacrifice (Sánchez-Fernández & Iniesta-Bonillo, 2007). The multidimensional research stream defines *perceived value* through several value dimensions (e.g., functional, hedonic, social, and price value) (Sweeney & Soutar, 2001). According to Sánchez-Fernández and Iniesta-Bonillo (2007, p. 441), this perspective allows researchers to link “broad predictors with broad outcomes,” but the definitions of dimensions can be questioned as the predictive power of separated dimensions is lower than that of the unidimensional construct. In this meta-analysis, we follow the logic of Sweeney and Soutar (2001) and investigate perceived value as a four-dimensional concept that includes functional, hedonic, social, and price value. We adopt the multidimensional perspective because the objective is to integrate research findings and prior studies have reported results including multiple dimensions.

4.3.2.1. *Functional value.* Following the definition of Sheth et al., (1991, p. 160), we operationalize *functional value* as the “perceived utility acquired from an alternative’s capacity for functional, utilitarian, or physical performance. An alternative acquires functional value through the possession of salient functional, utilitarian, or physical attributes. Functional value is measured on a profile of choice attributes.” The challenge for functional value in the freemium context is that it should be high enough to keep users but there should be a gap to premium services that motivates consumers to upgrade (Hamari et al., 2020). A free version of services is often designed to provide a basic level of functionality, but even functionality may be restricted for the free version (Vock et al., 2013). The effects of functional value on WTP seem to differ between different monetization strategies as Hamari et al. (2020) did not find significant effects in a context of selling virtual items. On the other hand, a significant effect was identified by Kim et al. (2018), who examined this relationship in the context of free smartphone applications. Interestingly, if the features of the free version of service were limited, both the low functionality of the free version and the high functionality of the premium version were linked with the willingness to switch to the premium version (Liu et al., 2021). As limited features are linked with the functionality of a product, we expect that functional value increases WTP for these services. Thus, we

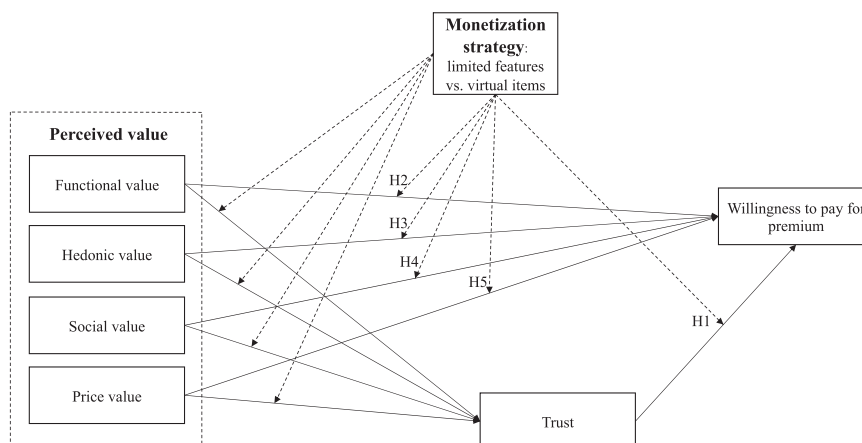


Fig. 1. The conceptual framework.

hypothesize the following:

H2. The positive impact of functional value on WTP is stronger for the “limited features” monetization strategy than it is for the “virtual items” monetization strategy.

4.3.2.2. Hedonic value. Hedonic value refers to the “perceived utility acquired from an alternative’s capacity to arouse feelings or affective states” (Sheth et al., 1991, p. 161). Similar to functional quality, the challenge in the freemium context is to provide an enjoyable experience but leave a gap to the premium service. Both positive and negative effects of hedonic value on WTP have been reported (Hamari, 2015; Hamari et al., 2020; Mäntymäki & Salo, 2013; Mäntymäki et al., 2020). The results presented by Hamari (2015) and Hamari et al. (2020) indicated a negative impact of hedonic value on WTP in an online gaming context. Mäntymäki and Salo (2013) presented contradictory findings when addressing these effects in virtual worlds. Later, Mäntymäki et al. (2020) found a positive impact of hedonic value on WTP among the users of music streaming services.

We expect that the impact of hedonic value on WTP differs according to the monetization of the service. Previous research highlights the importance of hedonic elements in selling virtual items (Meng et al., 2021). On the other hand, if the hedonic value of a free version is too high, consumers are not willing to pay for additional features. Some service providers even lower the hedonic value by adding intrusive advertising elements to free versions of services (Appel et al., 2020). Consequently, we argue that the impact of hedonic value on WTP is negative for “limited features” monetization strategies as a high level of enjoyment lowers the need to upgrade to premium services. In a context of virtual items, we expect contrary effects as hedonic value increases consumption. Thus, we hypothesize the following:

H3. The impact of hedonic value on WTP is negative for the “limited features” monetization strategy and positive for the “virtual items” monetization strategy.

Sheth et al., (1991, p. 161) defined *social value* as the “perceived utility acquired from an alternative’s association with one or more specific social groups.” As freemium services can contain social features, such as enabling user interactions and the possibility to share content and follow other users, the role of social value cannot be underestimated (Mäntymäki et al., 2020; Rietveld & Ploog, 2022). Social value influences WTP regardless of the monetization strategy as studies have indicated a positive impact for both purchasing virtual items and upgrading features (Hamari et al., 2020; Vock et al., 2013). Hamari et al. (2020) studied the impact of social value on WTP in a context of online gaming and observed that it increases in-game purchases. Vock et al. (2013) addressed the impact of social value on WTP for social network sites and found that social value is positively linked with willingness to upgrade accounts to premium accounts. However, the social aspects of freemium services relying on limiting features and those selling virtual items differ significantly. Mäntymäki and Salo (2015) identified social elements as the main drivers for purchases in virtual worlds. As virtual items are often consumed in these environments, we underline the importance of the social aspect of these purchases. For services focusing on features, social aspects are more diffuse. Service providers have integrated social aspects by, for example, allowing users to share content with others (Mäntymäki et al., 2020). However, possibilities for interaction are often limited for these services, and social value does not play an important role (Mäntymäki et al., 2020; Vock et al., 2013). Consequently, the theory suggests that social value is positively related to WTP. We highlight the role of social value in virtual worlds and hypothesize the following:

H4. The positive impact of social value on WTP is stronger for the “virtual items” monetization strategy than it is for the “limited features” monetization strategy.

4.3.2.3. Price value. Price value can be defined as “the utility derived

from the product due to the reduction of its perceived short-term and longer-term costs” (Sweeney & Soutar, 2001, p. 212). In a freemium context, price value is used to measure consumers’ evaluation of value for money (Mäntymäki et al., 2020). As consumers are aware of the quality of the free version, they evaluate the costs of the premium version according to this perception. We argue that this underlines the importance of the price value of freemium services when compared with service purchases made without pre-purchase knowledge. Varying results regarding the impact of price value on WTP have been published (Hamari et al., 2020; Mäntymäki et al., 2020). Hamari et al. (2020) did not find a significant direct effect of price value on in-game purchases, whereas Mäntymäki et al. (2020) presented price value as a significant predictor of the intention to make a premium subscription purchase for a music streaming service (Spotify). Consumers might perceive the price value of features versus virtual items differently. The sales of virtual items are often sliced into separate microtransactions (Hamari et al., 2020), which may lower the impact of price value on WTP. Contrary to this, freemium services that use the “limited features” model are typically purchased once, which may increase the risk related to transactions. In summary, it can be assumed that the impact of price value is positively linked with WTP, and this impact is stronger for services relying on the “limited features” monetization strategy. Therefore, we form the following hypothesis:

H5. The positive impact of price value on WTP is stronger for the “limited features” monetization strategy than it is for the “virtual items” monetization strategy.

4.4. Methodology

4.4.1. Data collection and coding

The literature search was conducted in several databases and sources (ABI/INFORM, Scopus, ProQuest Central, Emerald, EBSCO Business Source Premier, ProQuest Dissertation and Theses, Google Scholar, and ResearchGate) by using various search terms related to freemium business models (such as “freemium,” “free trial,” “free to play,” and “free to use”). Based on the recommendation of Jeyaraj and Dwivedi (2020), we complemented these search results by manually screening the reference lists of identified studies and relevant journals. We also screened the proceedings of relevant academic congresses.

The following inclusion criteria were set for potential studies:

1. The studies needed to provide quantitative empirical results based on primary data. Consequently, we excluded qualitative studies (e.g., Salehuddin & Alpert, 2021).
2. The studies had to address freemium services. Thus, we excluded studies addressing services that were not free (e.g., Kasilingam & Krishna, 2022).
3. The studies had to provide the information needed for effect size calculations.

Studies not reporting sample size, correlations, or other measurements that could be converted into effect sizes were excluded (e.g., Syahrivar et al., 2022). Finally, our data consisted of 55 independent samples with a total of 42,747 respondents (see Web Appendices A and B).

We followed the coding procedure of Rust and Cooil (1994). First, we identified all the variables addressed in our data. Second, we allocated the variables to categories with a common theme. Because the studies used different terms for the same variables, we paid attention to the measurement items. Several variables were found to measure the same construct (e.g., WTP and intention to pay; hedonic value and enjoyment). The definitions and aliases used in the coding are presented in Table 2. Based on these guidelines, correlation coefficients, sample size, and the reliability of measures were extracted by two independent coders. Inconsistencies in coding were resolved by discussion.

We selected a correlation coefficient to represent effect size as it was

Table 2
Definitions of the key constructs, aliases, and examples of operationalization.

	Construct	Definition	Aliases (representative studies)	Example operationalization
Variables	Willingness to pay	Consumer’s willingness to pay for a service (Wagner et al., 2014)	Intention to pay (Wagner et al., 2014), purchase intention (Hamari et al., 2020), intention to update to premium (Mäntymäki et al., 2020)	Willingness to pay can be measured using the 4-item scale of Teng and Laroche (2007) (e.g., “I would definitely intend to buy the premium version of service”)
	Trust	“A willingness to rely on an exchange partner in whom one has confidence” (Moorman et al., 1993, p. 315)	Credibility (Hussain et al., 2022), responsiveness (Hamari et al., 2017)	Trust can be measured using the 5-item scale of Koufaris and Hampton-Sosa (2004) (e.g., “The premium version is trustworthy”)
	Functional value	“The perceived utility acquired from an alternative’s capacity for functional, utilitarian, or physical performance” (Sheth et al., 1991, p. 160)	Usefulness (Mäntymäki & Salo, 2011), quality (Hamari et al., 2020), cognition (Wagner et al., 2014), relative advantage (Kim et al., 2018), performance expectancy (Guo & Barnes, 2011)	Sweeney and Soutar (2001) addressed functional value using a 6-item scale (e.g., “Service has consistent quality”)
	Hedonic value	“The perceived utility acquired from an alternative’s capacity to arouse feelings or affective states” (Sheth et al., 1991, p. 161)	Enjoyment (Hamari et al., 2020), entertainment (Hussain et al., 2022), affective involvement (Huang, 2012), playfulness (Hsiao & Chen, 2016)	Hedonic value was examined with a 3-item scale by Venkatesh et al. (2012) (e.g., “Using the service is fun”)
	Social value	“The perceived utility acquired from an alternative’s association with one or more specific social groups” (Sheth et al., 1991, p. 161)	Self-presentation norm (Kim et al., 2012), social influence (Baabdullah, 2018), social presence (Animesh et al., 2011)	Social value was investigated with the 4-item scale of Sweeney and Soutar (2001) (e.g., “The service would help me to feel acceptable”)
	Price value	“A willingness to rely on an exchange partner in whom one has confidence” (Moorman et al., 1992, p. 315)	Economic value (Hamari et al., 2020), value for money (Kim et al., 2018)	Price value can be examined using the 3-item scale of Venkatesh et al. (2012) (e.g., “The service is reasonably priced”)
Monetization strategy	Limited features	Offering a product with restricted functions or limited usage time (Sciglimpaglia & Raafat, 2022)		
	Selling virtual items	The sale of virtual items alongside the free core service (Hamari et al., 2020)		

most often used in the studies. If studies reported measures other than correlation coefficients, we converted them to correlations according to the procedures of Lipsey and Wilson (2001) and Peterson and Brown (2005).

4.4.2. Effect size integration

A random-effect approach (Borenstein et al., 2010; Hunter & Schmidt, 2004; Jeyaraj & Dwivedi, 2020) was applied for effect size integration due to the diverse sample. First, we corrected effect sizes in terms of measurement error. Specifically, we divided correlations by the square root of the reliability values of independent and dependent variables (Hunter & Schmidt, 2004). If studies failed to report this information, we used the average reliability for the respective construct.

Second, effect sizes were corrected for sampling error. Consequently, we averaged reliability-corrected correlations by applying sample-size weights (Hunter & Schmidt, 2004). Comprehensive Meta-Analysis 3 software was used for this phase.

Next, we calculated 95% confidence intervals, 80 % credibility intervals, Q-statistics, I² statistics, and fail-safe N (FSN) for each sample-weighted reliability-adjusted effect size. Confidence intervals indicate the amount of error around the averaged effect size caused by sampling error, and credibility intervals display the variation on effect sizes (Whitener, 1990). The Q-test displays substantial variance in the effect size’s distribution (Hunter & Schmidt, 2004). I² illustrates the proportion of variation due to between-study heterogeneity. FSN values are used to evaluate the file-drawer problem. FSN represents the number of

Table 3
Descriptive statistics.

Var 1	Var 2	Number of raw effects	Total N	Sample weighted reliability adjusted r	CI _{low}	CI _{high}	CR _{low}	CR _{high}	Q	I ²	FSN
Antecedents											
Trust	Willingness to pay	9	9893	.393 **	.297	.481	.164	.622	165.3 **	95.2	2251
Functional value	Willingness to pay	16	13518	.367 **	.297	.434	.147	.587	256.8 **	94.2	5889
Hedonic value	Willingness to pay	24	16118	.405 **	.340	.465	.146	.664	500.8 **	95.4	5223
Social value	Willingness to pay	19	16779	.447 **	.348	.536	.078	.816	932.0 **	98.1	6951
Price value	Willingness to pay	16	16620	.538 **	.426	.633	.113	.963	1193.2 **	98.7	7330
Functional value	Trust	4	2597	.420 **	.165	.622	.013	.827	82.1 **	96.3	287
Hedonic value	Trust	4	2045	.373 **	.189	.533	.087	.659	49.2 **	93.9	229
Social value	Trust	5	7783	.494 **	.292	.654	.103	.885	245.7 **	98.4	2278
Price value	Trust	3	6344	.282	-.224	.669	-.370	.934	109.7 **	98.2	-
Hedonic value	Functional value	10	8370	.699 **	.559	.801	-.332	1.208	933.2 **	99.0	10685
Social value	Functional value	10	4165	.357 **	.242	.462	.071	.643	232.5 **	96.1	2502
Price value	Functional value	6	3860	.438 *	.041	.715	-.332	1.208	778.0 **	99.4	1426
Social value	Hedonic value	13	7956	.431 **	.329	.522	.124	.738	318.9 **	96.2	5463
Price value	Hedonic value	9	3844	.483 **	.318	.619	.053	.913	290.5 **	97.2	2483
Social value	Price value	6	7657	.402 **	.195	.575	-.005	.809	258.0 **	98.1	869

Notes: ** = p < .01, * = p < .05, CI = 95 % confidence interval, CR = 80 % credibility interval, FSN = fail-safe N

studies with non-significant results that would nullify a significant result (Rosenthal, 1979). The integrated effect sizes and descriptive statistics are presented in Table 3.

4.4.3. MASEM

We tested our conceptual framework and differences between monetization strategy (limiting features vs. selling virtual items) by using a MASEM approach (Jeyaraj & Dwivedi, 2020). Following the procedure of Viswesvaran and Ones (1995), we compiled separate correlation matrices for both monetization strategies (see Tables 4–5). We managed to include all the variables from our conceptual framework in these matrices. The matrices with the harmonic means ($n_{\text{features}} = 1069$; $n_{\text{items}} = 1910$) were used as inputs in SPSS AMOS 28. Based on the past research, harmonic mean was used to represent the sample size (Mishra et al., 2023; Yu et al., 2020). Using the harmonic mean produces more conservative results when compared with using the arithmetical mean (Viswesvaran & Ones, 1995). As per Viswesvaran and Ones (1995) and Yu et al. (2020), we used the maximum likelihood estimation method. The moderating effects of the monetization strategies were compared using multigroup analysis. Following Iyer et al. (2020), we set error variances to zero.

4.5. Results

4.5.1. Descriptive statistics

As Table 2 indicates, the averaged effect sizes were significant for all the relationships except the correlation between price value and trust. We found strong support for the effect of the dimensions of perceived value on WTP for freemium services. Functional value, hedonic value, and social value were positively linked with trust, and trust was positively linked with WTP for freemium services. This is a preliminary indication of the potential mediating effect of trust.

The Q-statistics of the homogeneity test were all significant, indicating potential moderating effects (Hunter & Schmidt, 2004). Also, wide 80 % credibility intervals, illustrating the distribution of effect sizes, indicate the need for moderator analysis (Blut & Wang, 2020). Thus, we proceed to testing the proposed moderating effects using multigroup-analysis in the SEM.

4.5.2. MASEM results

The proposed model was tested using a MASEM approach. We performed a multigroup analysis to examine parameter estimate differences between the monetization strategies. The results (see Table 6 and Fig. 2) suggest that the formation of WTP for freemium services differs in several ways according to the monetization strategy. As the research model is saturated, both models display a perfect fit ($\chi^2 = 0$; d.f. = 0; SRMR = .000; RMSEA = .000; CFI = 1.000; GFI = 1.000). For the “limited features” monetization strategy, the model explained 44.2% of the variance in trust and 50.5 % of the variance in WTP. For the “virtual items” monetization strategy, the model explained 20.9 % of the variance in trust and 40.0 % of the variance in WTP.

Overall, the results of this meta-analysis highlight the differential roles of perceived value and trust in influencing WTP in the monetization strategies as all the paths differ significantly (see Table 6). Consequently, our findings confirm the moderating effect of the monetization

strategy. In the context of virtual items, trust had a significant impact on WTP ($\beta = .269, p < .05$), whereas its impact for the “limited features” monetization strategy was non-significant, confirming H1. Consequently, we argue that trust mediates the effects of perceived value on WTP in the case of purchasing virtual items but does not have a similar role in the “limited features” monetization strategy. Thus, we highlight the importance of the direct effects of perceived value on WTP for the “limited features” monetization strategy, instead of mediation through trust.

Our results underline the strong impact of functional value on WTP for the “limited features” monetization strategy ($\beta = .673, p < .05$). This path was non-significant for the “virtual items” monetization strategy. Therefore, H2 was confirmed. The impact of hedonic value on WTP was negative for the “limited features” monetization strategy ($\beta = -.629, p < .05$) and positive for the “virtual items” monetization strategy ($\beta = .136, p < .05$). Thus, H3 was confirmed. Interestingly, the impact of social value was stronger for the “limited features” monetization strategy ($\beta = .562, p < .05$) than it was for the “virtual items” monetization strategy ($\beta = .122, p < .05$). Thus, H4 was rejected. For price value, stronger effects on WTP were identified for the “limited features” monetization strategy ($\beta = .425, p < .05$) than were identified for the “virtual items” monetization strategy ($\beta = .317, p < .05$), confirming H5.

Regarding the impact on trust, our findings underscore the role of functional value ($\beta = .306, p < .05$) and social value ($\beta = .386, p < .05$) for the “virtual items” monetization strategy. Thus, functional value and social value are shown to increase trust. Interestingly, the impact of hedonic value was non-significant and the impact of price value was weak and negative ($\beta = -.078, p < .05$). Thus, trust partially mediates the impact of social value and price value on WTP. For functional value, our results indicate full mediation. Since the path from trust to WTP for the “limited features” monetization strategy was identified as non-significant, the mechanism behind the impact of perceived value on WTP relies on direct effects.

5. Study 2: exploratory qualitative study

5.1. Overview

The purpose of Study 2 is to further explore how the perceived value of the free version of the services in the freemium business model transforms to WTP for premium across monetization strategies. Thus, we conducted a qualitative interview study to deepen understanding of the obtained novel findings.

5.2. Method

We conducted 15 one-on-one in-depth semi-structured interviews with consumers with rich prior experience in freemium services. The interviews followed a semi-structured guide designed according to the main themes of Study 1. More specifically, the interviewees were asked to describe their recent experiences with freemium services and answer questions related to the perceived value of these services, perceptions regarding the service providers, and WTP for freemium services. The interview guide comprised three sections. The first part initiated with

Table 4
The correlation matrix (for virtual goods).

	Willingness to pay	Functional value	Hedonic value	Social value	Price value	Trust
Willingness to pay	1					
Functional value	.419	1				
Hedonic value	.421	.578	1			
Social value	.429	.386	.435	1		
Price value	.492	.450	.416	.408	1	
Trust	.425	.381	.269	.372	.176	1

Table 5
The correlation matrix (for limited features).

	Willingness to pay	Functional value	Hedonic value	Social value	Price value	Trust
Willingness to pay	1					
Functional value	.345	1				
Hedonic value	.363	.803	1			
Social value	.481	.040	.420	1		
Price value	.564	.383	.532	.398	1	
Trust	.385	.359	.466	.567	.330	1

Table 6
The results of multigroup analysis.

	Limited features	Virtual items	Model difference	
Direct effect	Beta (β)	Beta (β)	Δ β	p-value
Trust → WTP (H1)	-.022	.269 *	.291	< .000
Functional value → Trust	.480 *	.306 *	.174	< .000
Hedonic value → Trust	-.178 *	.001	.177	< .000
Social value → Trust	.626 *	.286 *	.340	< .000
Price value → Trust	-.008	-.078 *	.070	.024
Functional value → WTP (H2)	.673 *	.048	.625	< .000
Hedonic value → WTP (H3)	-.629 *	.136 *	.765	< .000
Social value → WTP (H4)	.562 *	.122 *	.440	< .000
Price value → WTP (H5)	.425 *	.317 *	.108	< .000

Notes: * $p < .05$; p -values illustrate model difference based on multigroup analysis and chi-square difference test

general inquiries, such as which freemium service interviewees utilized. The subsequent part involved questioning interviewees about the factors that lead them to pay for freemium services, aiming to capture their experiences with the service and discern the dimensions of perceived value. In the final section, interviewees were prompted to consider the significance of trust in their relationship with the service provider.

We collected data for the two monetization strategies identified in Study 1—eight interviewees focused on services with limited features and seven interviewees focused on services relying on a “virtual items” selling strategy. We used a purposeful criterion sampling method to gain knowledge about the research topic (Patton, 2002, pp. 40–46). The interviews were conducted in Finland during October 2023 in quiet locations. The interviews were audio-recorded, and transcribed into text

files, and translated from Finnish to English. The profile of our sample is presented in Table 7. The last interviews did not offer new insights, indicating data saturation (Namey et al., 2016).

Data analysis followed three-stage content analysis protocol: data reduction, data display, and drawing conclusions (Miles & Huberman, 1994). More specifically, two independent researchers read the responses and coded data according to the main themes.

5.3. Results

The findings of Study 2 confirmed that the impact of the dimensions of perceived value and trust on WTP for freemium services differs across services according to the monetization strategy. However, we also found differences across the services coded under the same monetization strategy. The detailed insights of the interviewees are discussed next.

5.3.1. WTP for virtual items

Participants were asked to describe the importance of the different dimensions of perceived value on WTP for virtual items. Perceived enjoyment and social value were identified as the key drivers of WTP for virtual items:

I enjoy using the service. Virtual items make the experience even more enjoyable. (M-01).

I play with my real-life friends. Purchasing virtual items facilitates the gameplay. (M-07).

Interestingly, despite the fact that functional value was not identified as the main driver of WTP for virtual items, some interviewees noted that functional value was closely linked to hedonic value. If the functionality of a service is low, it decreases the hedonic value of the service:

If the functionality of a game is low, it has an effect on enjoyment. This then has a negative effect on the flow of the experience and thus maybe also

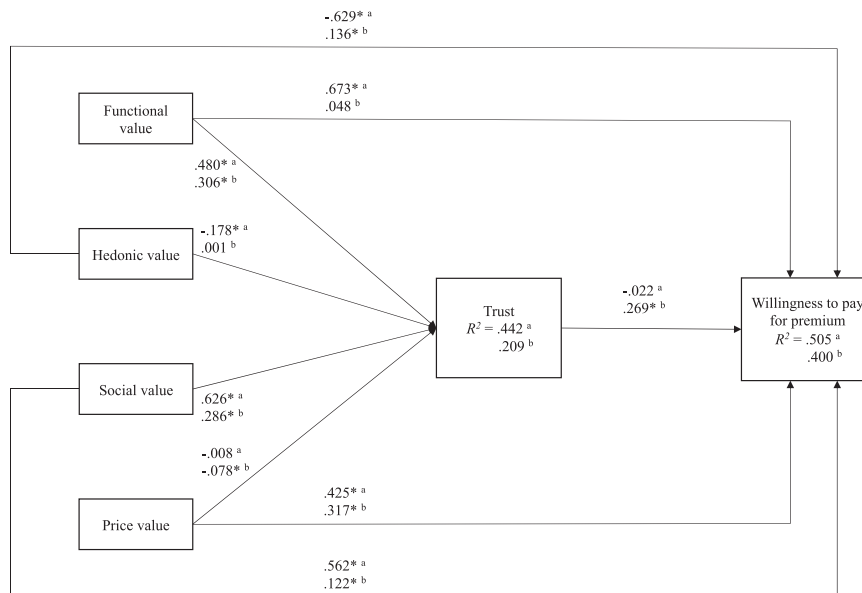


Fig. 2. The results of MASEM. Notes: * $p < .05$; ^a results concerning limited features; ^b results concerning virtual items.

Table 7
Profile of the sample.

	Gender	Monetization strategy	Service
1	Female (F-01)	Limited features	Spotify
2	Male (M-01)	Virtual items	Fortnite
3	Male (M-02)	Limited features	Spotify
4	Male (M-03)	Limited features	Spotify
5	Male (M-04)	Limited features	Spotify
6	Female (F-02)	Virtual items	Pokémon Go
7	Male (M-05)	Virtual items	Roblox
8	Male (M-06)	Limited features	Fortnite
9	Male (M-07)	Virtual items	Pokémon Go
10	Female (F-03)	Limited features	LinkedIn
11	Male (M-08)	Virtual items	Pidro
12	Male (M-09)	Limited features	iCloud
13	Male (M-10)	Limited features	Spotify
14	Male (M-11)	Virtual items	Fortnite
15	Male (M-12)	Virtual items	Habbo Hotel

on purchasing intentions. (N-02).

When participants were asked to describe the role of trust in a service, they noted that it has an impact on their WTP for virtual items but that it is not as important as the perceived value:

Of course, you are more willing to make purchases if you trust the service provider. However, if gaming is enjoyable, the flow blurs the risks related to transactions. (N-02).

5.3.2. WTP for premium features

For services using the “limited features” monetization strategy, the participants highlighted the importance of functional value as it affects the effectiveness of service use. The participants highlighted the importance of a premium version making their life easier:

The difference in functionality is the main difference between free and premium versions. (M-03).

Lowering the functionality of free version may result in the need to upgrade to the premium version. (M-04).

Several participants emphasized the importance of price value as the most important dimension of perceived value. Price value should exceed the threshold of the perceived usefulness of the service:

Price is the most important factor behind willingness to pay. For example, it is too high for this service, and thus, I do not purchase it. (M-04).

Similar to selling services using the “selling virtual items” strategy, functionality was linked with hedonic value for some services. However, the participants noted that hedonic value does not have any role related WTP for freemium services if the nature of the service is very utilitarian:

If functionality is low, the use of the service is less enjoyable. (M-02).

The importance of hedonic value varies according to the type of service. For example, it does have any effect for cloud storage services, but it has an important role for music streaming. (M-09).

When the participants were asked to describe the role of trust in a service, they did not find it to be as important as perceived value because they already know what to expect based on a free version:

I already know what to expect based on the free version, so trust in the service does not play a role for me.’ (M-10).

5.3.3. A summary of the findings and research propositions

Based on the results of Study 2, we formulate the following research propositions to guide future investigations into freemium services. The findings underscore the significance of hedonic value, social value, and trust in influencing willingness to pay (WTP) for virtual items. For services employing a limited features monetization strategy, primary drivers were identified as price value and functional value. Interviewees emphasized the importance of balancing price with the usefulness of the service, suggesting that the price value should align with the functional benefits offered. Consequently, we propose the following research proposition:

Proposition 1. The functional value of a service should correspond to

its price, particularly for services utilizing a limited features monetization strategy.

Interestingly, participants observed a close association between functional value and hedonic value across both monetization strategies. When the functionality of a service is lacking, the overall enjoyment diminishes, potentially impacting the WTP for a premium version, particularly in cases where the service is inherently hedonic. Thus, we establish the following proposition:

Proposition 2. Reducing the functionality of the free version may decrease the hedonic value of the service.

Furthermore, our findings indicate that the importance of value dimensions varies within monetization strategies depending on the nature of the service. Even within services employing a limited features monetization strategy, respondents noted distinctions. Given that some services are inherently hedonic, hedonic value assumes greater significance in these cases. Conversely, for utilitarian services, hedonic value holds little to no influence. Consequently, we propose the following research proposition:

Proposition 3. The impact of perceived value dimensions may vary depending on the type of service. Therefore, the type of service (e.g., hedonic or utilitarian) should be taken into account alongside the chosen monetization strategy.

6. Discussion

This present study aims to investigate the factors explaining the WTP for freemium services. This is accomplished by combining meta-analytical and qualitative studies. More specifically, our findings are based on a meta-analysis synthesizing 55 studies and 15 qualitative interviews. Combining meta-analytical results with interviews allows for a deeper interpretation of statistical findings.

This mixed-method study has generated several empirical findings that are unique in literature addressing freemium business models. First, we address the differences in the direct effects of the dimensions of perceived value on WTP. Answering the first research question: “What are the impacts of the dimensions of perceived value on WTP?” we found significant direct effects for all the dimensions except for functional value (in the context of virtual items) in Study 1. Thus, it can be stated that all the dimensions work as significant triggers for WTP but that their importance varies across monetization strategies. All the effects were positive except for the impact of hedonic value for the “limited features” monetization strategy. If the hedonic value of the free version is too high, consumers are not willing to upgrade to the premium version. These findings are supported by the qualitative results of Study 2. Consequently, our findings clarify the contradictory results regarding the effect of perceived value on WTP (Hamari, 2015; Hamari et al., 2020; Mäntymäki & Salo, 2013; Mäntymäki & Salo, 2015).

The findings of Study 1 provide an answer to the second research question: “How does trust mediate the relationship between perceived value and WTP?” Drawing on trust theory based on self-perception (Kim, 2008), we show that trust in a service is formed based on knowledge gained by using the free version of the service. When comparing the monetization strategies, we conclude that trust works as an important mediator between the dimensions of perceived value and WTP in the context of virtual items. Interestingly, based on the results of Study 2, we did not find similar effects in the context of limited features. We argue that trust plays a more important role for virtual items because it is more complex to understand the value of these products and the risk is consequently higher. The findings also indicate that trust did not play a role in the context of limited features as the users were familiar with the service based on the free version. Conversely, understanding the value of services is easier, and thus, it directly affects WTP. These results contribute to understanding of the role of uncertainty in relation to freemium services.

Third, we provide the results related to our last research question: “How does the impact of perceived value on WTP differ in the different monetization strategies of freemium services?” By addressing the differences between the strategies that limit features versus those that involve selling virtual items, we contribute to the literature by demonstrating the differences of these two monetization strategies for the freemium service models recognized in prior research (Hamari et al., 2020; Sciglimpaglia & Raafat, 2022; Lee & Tan, 2013). The results of Studies 1 and 2 illustrate several differences between the monetization strategies. By testing the moderating impact, we contribute to freemium research by explaining the reasons for the inconsistencies caused by the different contexts of previous studies. Future studies should make the differences of the monetization strategies clear.

6.1. The implications for theory

The findings of Studies 1 and 2 provide valuable insights that extend the theoretical contributions in several ways. This study proposed a conceptual framework rooted on a perceived value framework (Sweeney & Soutar, 2001) and self-perception theory (Doney et al., 1998). The findings of the meta-analytical study were validated by qualitative insights relying on interview data.

First, we focus on an unexplored phenomenon: the difference between monetization strategies. Previous studies have mainly been conducted in research settings that address a single service. Thus, the findings of Studies 1 and 2 enrich the research of freemium services by addressing the differences between two monetization strategies and by underlining the differing effects of the dimensions of perceived value on WTP for freemium services. Consequently, we clarify the reasons behind the contradictory findings in prior freemium studies regarding the effects of perceived value on WTP (Hamari, 2015; Hamari et al., 2020; Mäntymäki & Salo, 2013; Mäntymäki et al., 2020).

Second, rooted on trust theory based on self-perception (Doney et al., 1998), we present a research model that contains the new, unexplored path of the effect of dimensions of perceived value (Sweeney & Soutar, 2001) and trust on WTP for freemium services. In Study 1, we found that trust mediates the effects in the context of a “virtual items” monetization strategy, but not for a “limited features” monetization strategy. The results of Study 2 support these findings, as interviewees indicate that trust plays a role in the context of virtual items monetization strategy, but not in the context of limited features. Consequently, we found support for trust theory based on self-perception in the context of services that are selling virtual items. Therefore, we add to the research of freemium services by providing a more inclusive understanding of the mechanism behind the success of the virtual items monetization strategy.

6.2. The implications for practice

As this study contributes to understanding of the monetization strategies of freemium business models, it has valuable implications for practitioners. First, it enhances understanding of the role of perceived value in relation to WTP for freemium services. As our results show that the impact of perceived value on WTP differs significantly according to the monetization strategy, service providers should make the differences between these monetization strategies clear. The results regarding the differing importance of dimensions of perceived value should be noted when planning free versions of services. More specifically, we highlight the importance of hedonic value and social value for services using virtual items monetization strategy, and functional value and price value for services using limited features monetization strategy.

Second, our findings show that the impact of perceived value differs between the monetization strategies, but also within the monetization strategies. More specifically, firms using the limited features strategy provide diverse services, and the importance of the dimensions of perceived value may vary (for example, if the nature of the service is

hedonic or utilitarian). Thus, we argue that service providers should recognize the impact of the type of service on the importance of dimensions of perceived value. For instance, hedonic value plays a more significant role in hedonic services, while utilitarian value holds greater importance for utilitarian services.

Third, it seems that the dimensions of perceived value are closely linked. As per the results of our Study 2, functional value is closely linked with the enjoyment of using the service in both monetization forms. If the functional value is low, it lowers the hedonic value of service use, which may affect the user’s WTP for freemium services. Additionally, it appears that functional value and price value are closely intertwined for services employing a limited features monetization model. Therefore, service providers should acknowledge the impact of perceived value dimensions on WTP for freemium services, as well as consider other dimensions of perceived value when designing such services.

Fourth, we evaluated the impact of trust as a mediating mechanism between perceived value and WTP. Because trust is a key mediator that significantly influences the relationship between perceived value and WTP in the context of virtual items, freemium service providers should pay considerable attention to trust. Uncertainty related to virtual items plays an essential in guiding purchasing decisions related to virtual items that should be recognized by service providers. Thus, we underline the importance of building trust for service providers relying on the “virtual items” strategy.

Fifth, our results indicate that trust does not mediate the relationship between perceived value and WTP for freemium services focusing on selling premium features. As the value of premium features is easier to understand (as users have already tested similar functions with the free version), uncertainty related to a premium purchase does not play a notable role. Thus, services using the “limited features” strategy should mainly focus on the effects of perceived value on WTP for freemium services.

6.3. Limitations and future research directions

Because meta-analyses rely on data provided by previous research, they have several limitations in regard to offering future research avenues. The main limitation is that we compared our conceptual model against two monetization strategies (limited features vs. virtual goods). However, several other forms of monetization have been presented. For example, Sciglimpaglia and Raafat (2022) emphasized adding in-service advertisements to free versions of services. Because of the limited data, we could not address the impact of in-service advertising on WTP for premium versions. Also, other aspects, such as the impact of the free-trial length, should be investigated.

Based on the results of Study 2 (refer to Fig. 3), three future research propositions have been identified. Firstly, the link between functional value and price value was deemed significant within the context of a limited features monetization strategy. Subsequent research should explore how alterations in these dimensions impact each other’s effectiveness. Secondly, the relationship between functional value and hedonic value appears significant across both monetization strategies. Future studies ought to examine how changes in functional value influence hedonic value and subsequently affect WTP for premium services. Thirdly, the type of service appears to influence the impact of perceived value dimensions on WTP for premium services. Consequently, future studies should investigate the moderating effect of service type.

Finally, researchers expect that the service industry will be transformed in the future as consumers are shifting to the metaverse (Brüggemann & Lehmann-Zschunke, 2023; Wongkitrungrueng & Suprawan, 2023). More research will be needed from the viewpoint of its novel functionalities. For example, as Barreda and Shah (2023) have linked the metaverse with hyperconnectedness, the importance of social value might increase. In addition, the metaverse is expected to offer new

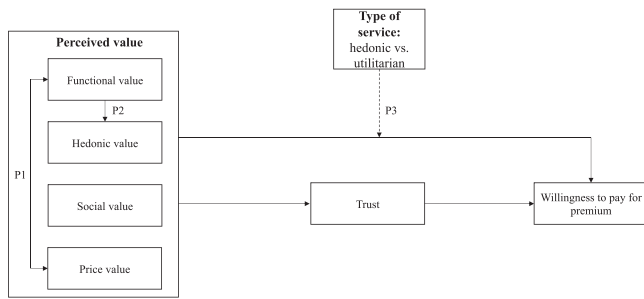


Fig. 3. Research propositions.

opportunities for companies to promote physical products (Yoo et al., 2023). As this meta-analysis addressed selling virtual goods in virtual environments, future studies should examine selling physical goods in virtual environments.

7. Conclusion

This study used a mixed-method approach to study the impact of perceived value on WTP for freemium services. More specifically, we performed a meta-analysis synthesizing 55 independent samples (with a total of 42,747 respondents addressing freemium online services) and 15 qualitative interviews. Our results showed that dimensions of perceived value (i.e., functional value, hedonic value, social value, and price value) work as triggers for WTP. We compared the effects of these dimensions on WTP in two monetization strategies (i.e., limiting features vs. selling virtual items). Our findings indicate that the effects differ significantly. In addition, trust mediated the effects of functional and social value on WTP for virtual items. Similar effects were not detected for the strategy of limiting features.

CRedit authorship contribution statement

Olli Tyrväinen: Writing – review & editing, Writing – original draft, Software, Project administration, Methodology, Investigation, Conceptualization. **Heikki Karjaluoto:** Writing – review & editing, Writing – original draft, Project administration, Investigation.

Funding

This research was funded by Liikesivistysrahasto (grant number: 20-11337) and Business Finland (grand number: 6659/31/2023).

Declaration of Competing Interest

none.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.ijinfomgt.2024.102787](https://doi.org/10.1016/j.ijinfomgt.2024.102787).

References

Animesh, A., Pinsonneault, A., Yang, S.-B., & Oh, W. (2011). An odyssey into virtual worlds: Exploring the impacts of technological and spatial environments on intention to purchase virtual products. *MIS Quarterly*, 25(3), 789–810.

Appel, G., Libai, B., Muller, E., & Shachar, R. (2020). On the monetization of mobile apps. *International Journal of Research in Marketing*, 37, 93–107.

Baabdullah, A. (2018). Consumer adoption of mobile social network games (M-SNGs) in Saudi Arabia: The role of social influence, hedonic motivation and trust. *Technology in Society*, 53, 91–102.

Barreda, K., & Shah, D. (2023). Marketing in the Metaverse: Conceptual understanding, framework, and research agenda. *Journal of Business Research*, 155, Article 113420.

Blut, M., & Wang, C. (2020). Technology readiness: A meta-analysis of conceptualizations of the construct and its impact on technology use. *Journal of the Academy of Marketing Science*, 48, 649–669.

Borenstein, M., Hedges, L. V., Higgins, J. P., & Rothstein, H. R. (2010). A basic introduction to fixed-effect and random-effects models for meta-analysis. *Research Synthesis Methods*, 1(2), 97–111.

Brüggenmann, P., & Lehmann-Zschunke, N. (2023). How to reduce termination on freemium platforms—Literature review and empirical analysis. *Journal of Marketing Analytics*.

Chiou, J.-S., Droge, C., & Hanvanich, S. (2002). Does customer knowledge affect how loyalty is formed? *Journal of Service Research*, 5(2), 113–124.

Dagger, T., & O'Brien, T. (2010). Does Experience matter? Differences in relationship benefits, satisfaction, trust, commitment and loyalty for novice and experienced service users. *European Journal of Marketing*, 44(9), 1528–1552.

Doney, P. M., Cannon, J. P., & Mullen, M. R. (1998). Understanding the influence of national culture on the development of trust. *The Academy of Management Review*, 23(3), 601–620.

Eisingerich, A., & Bell, S. (2008). Perceived service quality and customer trust: Does enhancing customers' service knowledge matter? *Journal of Service Research*, 10(3), 256–268.

Gu, X., Kannan, P. K., & Ma, L. (2018). Selling the Premium in Freemium. *Journal of Marketing*, 82(6), 10–27.

Guo, Y., & Barnes, S. (2011). Purchase behavior in virtual worlds. *Information & Management*, 48, 303–312.

Hamari, J. (2015). Why do people buy virtual goods? Attitude toward virtual good purchases versus game enjoyment. *International Journal of Information Management*, 35, 299–308.

Hamari, J., Hanner, N., & Koivisto, J. (2017). Service quality explains why people use freemium services but not if they go premium: An empirical study in free-to-play games. *International Journal of Information Management*, 37, 1449–1459.

Hamari, J., Hanner, N., & Koivisto, J. (2020). Why pay premium in freemium services? A study on perceived value, continued use and purchase intentions in free-to-play games. *International Journal of Information Management*, 51, Article 102040.

Hamari, J., & Keronen, L. (2017). Why do people buy virtual goods: A meta-analysis. *Computers in Human Behavior*, 71, 59–69.

Hamari, J., Malik, A., Koski, J., & Johri, A. (2019). Uses and gratifications of Pokémon Go: Why do people play mobile location-based augmented reality games. *International Journal of Human-Computer Interactions*, 35(9), 804–819.

Holm, A. B., & Günzel-Jensen, F. (2017). Succeeding with freemium: Strategies for implementation. *Journal of Business Strategy*, 38(2), 16–24.

Hsiao, K.-L., & Chen, C.-C. (2016). What drives in-app purchase intention for mobile games? An examination of perceived values and loyalty. *Electronic Commerce Research and Applications*, 16, 18–29.

Huang, E. (2012). Online experiences and virtual goods purchase intention. *Internet Research*, 23(2), 252–274.

Huang, H. (2016). Freemium business model: construct development and measurement validation. *Internet Research*, 26(3), 604–625.

Hunter, J. E., & Schmidt, F. L. (2004). *Methods of meta-analysis: Correcting error and Bias in research findings*. Thousand Oaks: Sage Publications.

Hussain, A., Abbasi, A., Hollebeek, L., Schultz, C., Ting, D., & Wilson, B. (2022). Videogames-as-a-service: Converting freemium-to paying-users through pop-up advertisement value. *Journal of Services Marketing*, 36(3), 398–415.

Iyer, G. R., Blut, M., Xiao, S. H., & Grewal, D. (2020). Impulse buying: a meta-analytic review. *Journal of the Academy of Marketing Science*, 48, 384–404.

Jeyaraj, A., & Dwivedi, Y. K. (2020). Meta-analysis in information systems research: Review and recommendations. *International Journal of Information Management*, 55, Article 102226.

Kasilingam, D., & Krishna, R. (2022). Understanding the adoption and willingness to pay for internet of things services. *International Journal of Consumer Studies*, 46(1), 102–131.

Koufaris, M., & Hampton-Sosa, W. (2004). The development of initial trust in an online company by new customers. *Information & Management*, 41(3), 377–397.

Kim, D. (2008). Self-perception-based versus transference-based trust determinants in computer-mediated transactions: A cross-cultural comparison study. *Journal of Management Information Systems*, 24(4), 13–45.

Kim, H.-W., Chan, H., & Kankanhalli, A. (2012). What motivates people to purchase digital items on virtual community websites? The desire for online self-presentation. *Information Systems Research*, 23(4), 1232–1245.

Kim, J., Lee, J., & Zho, H. (2018). Toward sustainable freemium software: The roles of user satisfaction and use context. *Journal of Electronic Commerce Research*, 19(3), 201–222.

Kim, H.-W., Chan, H., & Kankanhalli, A. (2012). What motivates people to purchase digital items on virtual community websites? The desire for online self-presentation. *Information Systems Research*, 23(4).

Kumar, V. (2014). Making 'freemium' work: many start-ups fail to recognize the challenges of this popular business model. *Harvard Business Review*, 92(5), 27–29.

Lee, Y., & Tan, Y. (2013). Effects of different types of free trials and ratings in sampling of consumer software: An empirical study. *Journal of Management Information Systems*, 30(3), 213–246.

Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis*. Thousand Oaks: Sage.

Liu, Z., Zhao, Y., Chen, S., Song, S., Hansen, P., & Zhu, Q. (2021). Exploring askers' switching from free to paid social Q&A services: A perspective on the push-pull-mooring framework. *Information Processing and Management*, 58, Article 102396.

Luo, X., Zhang, J., & Li, M. (2022). Freemium strategy in competitive app markets: Maintaining profitability with product fit uncertainty. *Journal of the Association for Information Systems*, 23(6), 1485–1531.

- Makmor, N., Alam, S. S., & Aziz, N. A. (2018). Social support, trust and purchase intention in social commerce era. *International Journal of Supply Chain Management*, 7(5), 572–581.
- Meng, Z., Hao, L., & Tan, Y. (2021). Freemium pricing in digital games with virtual currency. *Information Systems Research*, 32(2), 481–496.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis*, Second edition. Sage Publications. CA: Thousand Oaks.
- Mishra, A., Shukla, A., Rana, N., Currie, W., & Dwivedi, Y. K. (2023). Re-examining post-acceptance model of information systems continuance: A revised theoretical model using MASEM approach. *International Journal of Information Management*, 68, Article 102571.
- Moorman, C., Zaltman, G., & Deshpande, R. (1992). Relationships between providers and users of market research: The dynamics of trust within and between organizations. *Journal of Marketing Research*, 29, 314–328.
- Morgan, R. M., & Hunt, S. D. (1994). The commitment-trust theory of relationship marketing. *Journal of Marketing*, 58(3), 20–38.
- Mäntymäki, M., Islam, A. K. M., & Benbasat, I. (2020). What drives subscribing to premium in freemium services? A consumer value-based view of differences between upgrading to and staying with premium. *Information Systems Journal*, 30, 295–333.
- Mäntymäki, M., & Salo, J. (2011). Teenagers in social virtual worlds: Continuous use and purchasing behavior in Habbo Hotel. *Computers in Human Behavior*, 27(6), 2088–2097.
- Mäntymäki, M., & Salo, J. (2013). Purchasing behavior in social virtual worlds: An examination of Habbo Hotel. *International Journal of Information Management*, 33(2), 282–290.
- Mäntymäki, M., & Salo, J. (2015). Why do teens spend real money in virtual worlds? A consumption values and developmental psychology perspective on virtual consumption. *International Journal of Information Management*, 35, 124–134.
- Namey, E., Guest, G., McKenna, K., & Chen, M. (2016). Evaluating bang for the buck: A cost-effectiveness comparison between individual interviews and focus groups based on thematic saturation levels. *American Journal of Evaluation*, 37(3), 425–440.
- Patton, M. (2002). *Qualitative research & evaluation methods*. Fourth edition. Saint Paul, MN: Sage Publications.
- Peterson, R., & Brown, S. (2005). On the use of beta coefficients in meta-analysis. *Journal of Applied Psychology*, 90(1), 175–181.
- Rietveld, J., & Ploog, J. (2022). On top of the game? The double-edged sword of incorporating social features into freemium products. *Strategic Management Journal*, 43, 1182–1207.
- Ritzer, G., & Jurgenson, N. (2010). Production, consumption, prosumption: The nature of capitalism in the age of the digital 'Prosumer'. *Journal of Consumer Culture*, 10(1), 13–36.
- Rosenthal, R. (1979). The file drawer problem and tolerance for null results. *Psychological Bulletin*, 86, 638–641.
- Rust, R. T., & Cooil, B. (1994). Reliability measures for qualitative data: Theory and implications. *Journal of Marketing Research*, 31(1), 1–14.
- Salehuidin, I., & Alpert, F. (2021). No such thing as a free app: A taxonomy of freemium business models and user archetypes in the mobile game market. *ASEAN Marketing Journal*, 13(2), 121–142.
- Sánchez-Fernández, R., & Iniesta-Bonillo, M.Á. (2007). The concept of perceived value: A systematic review of the research. *Marketing Theory*, 7(4), 427–451.
- Sciglimpaglia, D., & Raafat, F. (2022). Freemium marketing: Use of demand-side research in market segmentation strategy. *Journal of Strategic Marketing*, 30(7).
- Shah, D., & Murthi, B. P. S. (2021). Marketing in a data-driven digital world: Implications for the role and scope of marketing. *Journal of Business Research*, 125, 772–779.
- Sheth, J., Newman, B., & Gross, B. (1991). Why we buy what we buy? A theory of consumption values. *Journal of Business Research*, 22, 159–170.
- Sweeney, J., & Soutar, G. (2001). Consumer perceived value: The development of a multiple item scale. *Journal of Retailing*, 77(2), 203–220.
- Syahriwar, J., Chairy, C., Juwono, I., & Hyulavári, T. (2022). Pay to play in freemium mobile games: A compensatory mechanism. *International Journal of Retail & Distribution Management*, 50(1), 117–134.
- Teng, L., & Laroche, M. (2007). Building and testing models of consumer purchase intention in competitive and multicultural environments. *Journal of Business Research*, 60(3), 260–268.
- Trenz, M., Huntgeburth, J., & Veit, D. (2019). How to succeed with cloud services? *Business & Information Systems Engineering*, 61, 181–194.
- Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), 157–178.
- Viswesvaran, C., & Ones, D. S. (1995). Theory testing: Combining psychometric meta-analysis and structural equations modeling. *Personnel Psychology*, 48(4), 865–885.
- Vock, M., van Dolen, W., & Ruyter, K. (2013). Understanding willingness to pay for social network sites. *Journal of Service Research*, 16(3), 311–325.
- Wagner, T., Benlian, A., & Hess, T. (2014). Converting freemium customer from free to premium – the role of the perceived premium fit in the case of music as service. *Electronic Markets*, 24, 259–268.
- Whitener, E. (1990). Confusion of confidence intervals and credibility intervals in meta-analysis. *Journal of Applied Psychology*, 75(3), 315–321.
- Wongkitrungrueng, A., & Suprawan, L. (2023). Metaverse meets branding: Examining consumer responses to immersive brand experiences. *International Journal of Human-Computer Interaction*.
- Yoo, K., Welden, R., Hewett, K., & Haenlein, M. (2023). The merchants of meta: A research agenda to understand the future of retailing in metaverse. *Journal of Retailing*, 99, 173–192.
- Yu, L., Li, H., He, W., Wang, F.-K., & Jiao, S. (2020). A meta-analysis to explore privacy cognition and information disclosure of internet users. *International Journal of Information Management*, 51, Article 102015.
- Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: A means-end model and synthesis of evidence. *Journal of Marketing*, 52(3), 2–22.