



Understanding users' motivations to engage in virtual worlds: A multipurpose model and empirical testing

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ABSTRACT

Despite the growth and commercial potential of virtual worlds, relatively little is known about what drives users' motivations to engage in virtual worlds. This paper proposes and empirically tests a conceptual model aimed at filling this research gap. Given the multipurpose nature of virtual worlds the model integrates extrinsic and intrinsic motivation as behavioral determinants. By making use of the literature on information system value and motivation theory four important system-specific virtual world characteristics (economic value, ease of use, escapism, visual attractiveness) are added as motivational drivers. Using structural equation modeling on a sample of 846 users of the virtual world Second Life the hypotheses were tested. The results support the model; they confirm the role of extrinsic and intrinsic motivation as behavioral determinants and show how and to what extent the four system-specific elements function as motivational basis. Implications for research and practice are discussed.

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1. Introduction

With increasing usage, virtual worlds (VWs) have steadily advanced into more complex systems. Virtual worlds, defined as three-dimensional interactive environments where multiple users simultaneously participate through their avatars (Messinger et al., 2009; Sutanto, Phang, Tan, & Lu, 2011) were initially developed to serve gaming communities. Hence, they were primarily designed in line with the *intrinsic motives* of those intending to use the system, that is, to create pleasurable experiences and provide self-fulfilling value (Ryan & Deci, 2000b). Gradually, VWs such as Second Life and Active Worlds have started to fulfill a more instrumental role by enabling their increasing number of users to perform rather utilitarian tasks such as buying financial services, following courses, building and leasing stores, and co-creation of innovations (Kohler, Fueller, Stieger, & Matzler, 2011; Mennecke et al., 2008; Shelton, 2010). Accordingly, VWs increasingly adapt to those willing to use these environments for *extrinsic motives*, which relates to the achievement of goals/benefits external to the system–user interaction (Van der Heijden, 2004). Given their diversified usage VWs represent an emerging class of information technology (IT) innovations that are referred to in this study as multipurpose infor-

mation systems (MPIS) (Hong & Tam, 2006). Following motivation theory (Ryan, Rigby, & Przybylski, 2006), developing understanding on the reasons behind the usage of such systems demands for a careful consideration of key intrinsic and extrinsic motives as well as their underlying determinants. Remarkably, and as echoed in recent calls for more research on the motives behind VW usage (e.g., Jung & Kang, 2010; Zhou, Jin, Vogel, Fang, & Chen, 2011), these issues have hardly been addressed in the existing body of literature.

In this paper we adopt a MPIS perspective¹ to provide an insight into the role of intrinsic and extrinsic motivations as determinants of VW usage and assess the functioning of four system-specific elements (economic value, ease of use, escapism, visual attractiveness) as underlying motivational mechanism therein. Our findings reveal strong direct effects of both extrinsic motivation (perceived usefulness) intrinsic motivation (entertainment value) on the attitude towards VW usage, with extrinsic motivation also influencing intrinsic motivation. We also find that these motivations are largely determined by the system-specific elements economic value, perceived ease of use and escapism. The combined and mutual influence of extrinsic and intrinsic motivations on attitude towards VW usage emphasizes the specific nature of VWs as MPIS, and have implications for both theory and practice.

¹ Adoption of the MPIS perspective goes beyond seeing VWs merely as social system. Unlike social VWs (e.g. Habbo Hotel; Club Penguin), which are a specific subset of VWs that are mainly used for the intrinsic purposes of social interaction and entertainment (Mäntymäki & Salo, 2011), many VWs today are used for a mixture of extrinsic and intrinsic reasons (e.g. Second Life, Active Worlds).

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First, at a rather abstract level, we contextually extend the extensive program of IT and information system research on intrinsic and extrinsic user motivations to multipurpose settings. The vast majority of user motivation studies has focused on either hedonic or utilitarian system usage. The influence of motives on system usage, however, heavily depends on the nature of the system in question (Van der Heijden, 2004). As such, our research should be seen as an attempt to contextually extend and validate the influence of intrinsic and extrinsic motivation to VW settings (cf., Berthon, Pitt, Ewing, & Carr, 2002).

Second, at the more specific level, the four selected system-specific elements are rather distinctive for VWs, which makes it of particular interest to study their role as motivational drivers. The increasing prominence of economic activity within VWs underlines the value of an empirical investigation into the role of *economic value*. The need to examine *ease of use* in VW settings is exemplified by the fact that VW usage requires users to get familiar with navigating using an avatar, which is likely to put an emphasis on ease of use in shaping user motivations. The relatively new concept of *escapism* is of particular interest as VW users may make use of avatars to construct a new self and engage in role-playing as a way to escape from the unpleasant aspects of everyday life. The significance of studying the role of *visual attractiveness*, in closing, is underlined by the game-like three-dimensional aesthetic experience that VWs provide, which may stimulate user behavior.

Third, from a managerial perspective, grasping the mechanisms underlying user motivation allows operators and designers of VWs to prioritize development efforts. By building a better understanding of users' motivational basis operators and designers are guided to focus on those elements that first and foremost drive users to engage in VWs. Given that such knowledge is seen as a first step towards VW success (Zhou et al., 2011), our research may contribute to long-term VW sustainability.

The remainder of this paper is structured as follows. First, we provide a conceptual background by briefly considering the notion of information system value and theory on user motivations. Next, we identify and conceptualize the key constructs in our model, elaborate on its theoretical foundation, and introduce hypotheses. The research model is then tested in a large-scale survey completed by users of the VW Second Life. The results are discussed and conclusions drawn. The paper closes with the theoretical and practical implications of our findings.

2. Conceptual background

2.1. Information system value

Research on IT usage has classified information systems according to the value they provide to users. Reflecting the user's overall experience of interacting with the system based on both the system's usefulness and provision of enjoyment and/or fun (adapted from Babin, Darden, & Griffin, 1994; Holbrook, 1986), system value is assumed to be an important determinant of its usage. A common value-based classification, which originates in the consumer behavior literature (e.g., Babin et al., 1994; Hirschman & Holbrook, 1982; Holbrook & Hirschman, 1982a), differentiates between utilitarian and hedonic information systems (cf., Van der Heijden, 2004). *Utilitarian information systems* refer to systems that are mainly used to achieve goals that are external to system usage (Van der Heijden, 2004). As such, they provide instrumental utility to the user. *Hedonic information systems* on the other hand, are systems that are used for their own sake and provide feelings of enjoyment, pleasure and excitement (cf., Babin et al., 1994). The usage of hedonic systems is mainly exper-

iential in nature, which implies that users strive for instant hedonic pleasure while the consequences of usage appear in the fun and pleasure of the experience itself (Holbrook & Hirschman, 1982a, 1982b).

While the distinction between utilitarian and hedonic information systems is widely accepted, and research has demonstrated the predictive power of this value dichotomy in explaining the relative weights of information system usage determinants (e.g., Van der Heijden, 2004; Wakefield & Whitten, 2006), recent technological developments seem to challenge its applicability. In particular, we refer to the emerging class of systems that provide both utilitarian and hedonic value (e.g., VWs, smart phones; mobile data services). These systems, alluded to in our introduction as MPIS, incorporate instrumental and experiential functions in one environment (Hong & Tam, 2006). A main challenge for developers of MPIS is how to apply an integrated suite of instrumental and experiential functions, in order to enable productive and prolonged use. Such integration demands a thorough understanding of the system-specific drivers behind system usage and their relationships with the key motives underlying system usage.

2.2. Motivation theory

A significant body of research has used motivation theory (Deci & Ryan, 1985; Vallerand, 1997) to predict the usage of information systems. Referring to "enduring predispositions that arouse and direct behavior toward certain goals" (Engel, Blackwell, & Miniard, 1995, p. g-9), motivations are seen as key determinants of information system usage. Two types of motivation exist, namely extrinsic motivation and intrinsic motivation.

Extrinsic motivation is defined as "doing something because it leads to a separable outcome" (Ryan & Deci, 2000b, p. 55). Extrinsic motivation is driven by the instrumental value of the performed activity (Ryan & Deci, 2000b), which is derived from the outcome of the activity rather than from the activity itself (Davis, Bagozzi, & Warshaw, 1992). Given the instrumental value of utilitarian systems, extrinsic motivations have been theorized as dominant predictors of their usage (Wakefield & Whitten, 2006). Most theories on information system usage (see Venkatesh, Morris, Davis, & Davis, 2003) are productivity-oriented and consequently use extrinsic motivations as key determinants of utilitarian system use. Extrinsic motivation can either be autonomous or controlled in nature (Grouzet, Vallerand, Thill, & Provencher, 2004). Autonomous extrinsic motivation represents an external goal or regulation, which an individual determines to be personally endorsing and valuable, and, thus, is associated with a high degree of autonomy (Grouzet et al., 2004, p. 332). On the other hand, controlled extrinsically motivated behavior concerns activities that are mainly done due to external obligation (e.g., reward, punishment) or internal pressure (e.g., guilt, pride, ego) (Deci & Ryan, 1985; Vallerand & Bissonnette, 1992). In this study, we view extrinsic motivation for VW usage as being autonomous in nature. This inference rests on the premise that participation in VWs is for the most part voluntary (Bartle, 2004).

Intrinsic motivation refers to "doing an activity for the inherent satisfaction of the activity itself" (Ryan & Deci, 2000a, p. 71). Intrinsically motivated behavior is self-determined, volitional (Deci & Ryan, 1985) and involves people engaging in activities that they find interesting, new, and optimally challenging (Deci & Ryan, 1985, p. 235). As opposed to extrinsic motivation, intrinsic motivation derives its value from the appreciation of the activity itself rather than its instrumental outcome (Mathwick, Malhotra, & Ridgion, 2001). In information system research, intrinsic motivation is seen as a strong predictor of hedonic system usage (Venkatesh, 1999).

3. Research model and hypotheses

To substantiate the model construction and selection of the research constructs, we first conducted a systematic review of the literature (cf., Williams, Dwivedi, Lal, & Schwarz, 2009). Using three scientific databases (ScienceDirect, ABI/INFORM, and Wiley), a total of around 400 academic papers were found for the search term “virtual world” (abstract, title, keywords). Of this initial pool 30 papers reported empirical research on user motivations. As 7 of these motivation studies focused on other variables than VW usage we decided to exclude these from further review. The result was an updated pool of 23 empirical studies on user motivations in VW settings (see Table 1).

Taking into account the theoretical focus and the motivations centered on in the 23 studies, we propose a research model (see Fig. 1) that integrates as well as extends the existing studies on VW usage.

In line with motivation theory, the backbone of the model incorporates the two general perceptions usefulness and entertainment value as proxies for extrinsic and intrinsic motivation. A few scholars have started to test the roles of both types of motivation in previous VW usage studies (e.g., Mäntymäki & Salo, 2011; Shen & Eder, 2009; Yeh, Lin, & Lu, 2011), implying that the backbone of our model is validated in relation to the existing body of research. Still, as these scholars made little use of traditional motivation theory to ground their work, our approach leads to alternative explanations for role of both types of motivation. Following Hsieh, Rai, and Keil (2008), *perceived usefulness* equals extrinsic motivation, the relative advantage of a system, and is defined as the degree to which a system is perceived as providing benefits in performing certain tasks (Hong & Tam, 2006). *Entertainment value* approximates the perceived degree to which the use of an information system is a fun and pleasant experience, and lifts the user's spirit (cf., Ducoffe,

1996). Further, to develop an understanding of the specific nature of VW systems we included four perceptions that are unique to the characteristics of this MPIS, and that are expected to have an effect on both intrinsic and extrinsic motivations: economic value, perceived ease of use, escapism and visual attractiveness. As reflected in Table 1, these four elements have received relatively little to no attention in the VW literature, making an examination worthwhile. *Economic value* is defined as the buyers' net gain (or trade-off) from acquiring a product or service (Grewal, Monroe, & Krishnan, 1998), and is related to commercial activities such as buying (digital) products and trading virtual property. *Perceived ease of use* refers to the degree to which a person believes that learning to navigate a particular system is free of effort (Davis, 1989). *Escapism* refers to the extent to which the user becomes so absorbed by using an IS that it fulfils his desire to ‘leave’ the reality in which he lives in a cognitive and emotional way (Henning & Vorderer, 2001). *Visual attractiveness* reflects the degree to which a person believes that an information system is aesthetically pleasing to the eye (Van der Heijden, 2003, p. 544).

The logic behind our model rests on four theoretical considerations. First, we use the attitude towards use as behavioral variable. This particular attitude is a widely accepted proxy for information system usage and success and has been applied in theoretical frameworks such as self-determination (Ryan & Deci, 2000a), innovation diffusion (Rogers, 1995), expectancy-value, reasoned action (Fishbein & Ajzen, 2010), and technology acceptance (Davis, 1989). Second, in line with self-determination theory (Ryan & Deci, 2000a), we suggest that both extrinsic motivation and intrinsic motivation may have direct influences on the attitude as behavioral variable (cf., Mäntymäki & Salo, 2011). Both types of motivation have been linked directly to multiple forms of behavior (for an overview see Deci & Ryan, 1985), and thus seem of specific interest to understand usage of VWs as MPIS. Third, rooted in

Table 1
Empirical motivation studies on VWs.

Author(s) (Year)	Media	Theoretical background	Motivations
Bartle (2004)	Gaming virtual world	Exploratory approach	Socialization, exploring, achieving, competing
Ryan et al. (2006)	Video games	Cognitive evaluation theory	Competence, autonomy, relatedness
Yee (2006)	Gaming virtual world	Exploratory approach	Achievement, social, immersion
Fetscherin and Lattemann (2008)	Virtual world	Technology acceptance	Communication, collaboration, cooperation
Williams, Yee, and Caplan (2008)	Gaming virtual world	Exploratory approach	Sociability, achievement, immersion
Hua and Haughton (2009)	Virtual world	Technology acceptance	Social influence, ease of use, compatibility, usefulness
Merikivi (2009)	Social virtual world	Theory of planned behavior	Enjoyment, playfulness, social presence
Shen and Eder (2009)	Virtual world	Technology acceptance	Usefulness, enjoyment, playfulness, self-efficacy
Shin (2009)	Virtual world adoption	Technology acceptance	Synchronicity, empathy, self-Efficacy
Iqbal, Kankaanranta, and Neittaanmäki (2010)	Virtual world	Exploratory approach	Social networking, gaming
Jung and Kang (2010)	Social virtual world	Means-end chain analysis	Escapism, financial, amusement, social relations
Lee (2010)	Gaming virtual world	Exploratory approach	Role-playing, achievement, storyline, public phrase
Nah, Eschenbrenner, DeWester, and Park (2010)	Virtual world	Flow theory	Flow, brand equity
Przybylski, Rigby, and Ryan (2010)	Video games	Cognitive evaluation theory	Competence, autonomy, relatedness
Shelton (2010)	Virtual world	Gratification model	Identity, social/entertainment, achievement
Barnes (in press)	Virtual world	Use continuance	Usefulness, enjoyment, habit
Barnes and Pressey (2011)	Virtual world	Maslow's hierarchy	Arousal, pleasure, individualism
Eisenbeiss, Blechschmidt, Backhaus, and Freund (in press)	Virtual world	Gratification model	Socializing, creativity, escape
Goel, Johnson, Junglas, and Ives (2011)	Virtual world	Interactionist theory of place attachment	Cognitive absorption
Mäntymäki and Salo (2011)	Social virtual world	Technology acceptance	Enjoyment, usefulness, ease of use
Partala (2011)	Virtual world	Qualitative approach	Autonomy, self-esteem, relatedness
Yeh et al. (2011)	Virtual world	Technology acceptance	Ease of use, usefulness, social presence, enjoyment
Zhou et al. (2011)	Social virtual world	Gratification model	Functional, experiential, social

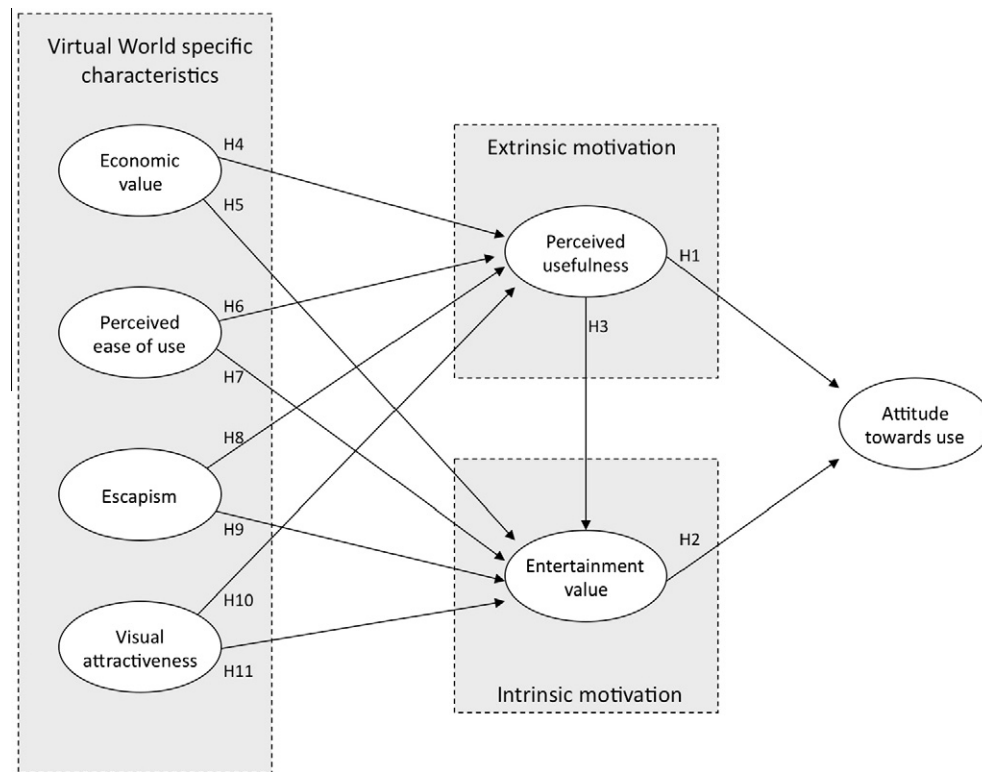


Fig. 1. Proposed theoretical model and research hypotheses.

cognitive evaluation theory (Ryan & Deci, 2000a, 2000b), we acknowledge that autonomous extrinsic motivations are more likely to enhance intrinsic motivations than vice versa in situations that stimulate visual exploration, curiosity, pleasure, and avoiding boredom (Deci & Ryan, 1985). In these situations, the playfulness of the system is likely to elicit more concentration, more exploration, and more involvement when completing tasks (Starbuck & Webster, 1991), which makes it plausible to assume favorable effects of perceptions of system instrumentality on intrinsic motivation. Fourth, reflecting overall impressions of the utility and joy of a system, perceived usefulness and entertainment value are positioned as dependent constructs within the extrinsic and intrinsic perspectives, that is, the underlying system specific characteristics (economic value, perceived ease of use, escapism, and visual attractiveness) are assumed to reinforce both entertainment value and perceived usefulness. The rationale for this order of effects comes from online motivation research where perceived usefulness and entertainment value are seen as core motivations (Eighmey & McCord, 1998; Korgaonkar & Wolin, 1999; Roy, 2009) and is further supported by empirical evidence that perceived usefulness and entertainment value may mediate the second-order effects of other motivations on behavioral variables (e.g., Van der Heijden, 2003). In the remainder of this section we elaborate on the research constructs and their assumed interrelationships.

3.1. Motivation orientations

Several socio-psychological theoretical lenses have been applied to relate the perceptions usefulness and entertainment value to the use of utilitarian, hedonic and multipurpose systems. Some of the most prominent of these theoretical lenses are the Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB) (Fishbein & Ajzen, 2010), and Decomposed Theory of Planned Behavior

(DTPB) (Taylor & Todd, 1995). Overall, TRA, TPB and DTPB suggest that an individual's beliefs about a particular behavior are among the most important determinants of his attitude towards that behavior. In the case of an information system, perceived usefulness is one of these beliefs. When an individual believes that an information system is useful in improving his task performance, his attitude towards using that information system becomes more positive (cf., Kim, Chan, & Gupta, 2007). Since VWs also can be put to use to improve task execution (Jung & Kang, 2010; Kohler et al., 2011), this makes it plausible to assume:

H1. Perceived usefulness positively influences the attitude towards using a VW.

A substantial body of evidence shows that when a user believes that a system satisfies his needs for pleasure and fun, this has a positive effect on a multitude of digital environment-related attitudes. Among such attitudes are the attitude towards using an information system (Bruner & Kumar, 2005; Dabholkar & Bagozzi, 2002), the attitude towards websites (Kang & Kim, 2006; Moon & Kim, 2001; Richard, 2005), and the attitude towards Internet or mobile advertising (Tsang, Ho, & Liang, 2004; Xu, Liao, & Li, 2008). Prior scholarly work suggests that this effect is especially relevant in the case of information systems that (also) have a hedonic function (Van der Heijden, 2004). Given the hedonic functions that VWs provide, it can be anticipated that:

H2. Entertainment value positively influences the attitude towards using a VW.

Following cognitive evaluation theory, contextual cues or events that induce feelings of autonomy and competence when completing an extrinsic task are likely to enhance a person's intrinsic motivation (Ryan & Deci, 2000a, 2000b). Thus, it stands to reason that in situations where an information system is useful in achieving personal tasks in a self-determined effective way, users

will get the impression that using the system is intrinsically rewarding (Ryan & Deci, 2002). A typical example of such a setting is a VW, where most users spend their free time to pursue self-defined objectives while having high levels of control over their actions (Messinger et al., 2009). This makes it plausible to assume that perceptions of the usefulness of a VW add to the impression that using the VW is entertaining in itself. Consequently, in line with research findings of Jung and Kang (2010), we hypothesize that:

H3. Perceived usefulness positively influences the entertainment value of a VW.

3.2. Economic value

Previous research (e.g., Amoako-Gyampah & Salam, 2004; López-Nicolás, Molina-Castillo, & Bouwman, 2008) indicates that perceived usefulness as the overall perceived benefit is determined by the particular, separable perceived benefits, such as cost savings, resulting from using an information system. Clearly, economic value that can be derived from commercial activities in VWs (by making a profit, getting a “good buy”, etc.) is an example of such a separable outcome. As economic value is positively related to the evaluation and acquisition of products or services (Dodds, Monroe, & Grewal, 1991; Grewal et al., 1998) and was found to be an important reason for people to join and use VWs (Jung & Kang, 2010), we expect economic value to be an antecedent of perceived usefulness of a VW. In addition, economic value may also lead to more intrinsic motivation to use a VW. Purchasing has been argued to generate hedonic value like entertainment particularly when it is economic value-oriented, i.e., when it concerns getting good value for money and bargain hunting (Babin et al., 1994). According to Arnold and Reynolds (2003) the achievement of obtaining such economic value gives the shopper a sense of competence and is thus an intrinsically motivated pleasant experience.

In sum, this leads us to assume that:

H4. Economic value positively influences the perceived usefulness of a VW.

H5. Economic value positively influences the entertainment value of a VW.

3.3. Ease of use

Following theory on self-efficacy (Bandura, 1982), social psychologists (e.g., Hill, Smith, & Mann, 1987) have suggested that when users perceive that they have the ability to successfully interact with an information system, i.e., without difficulties, they will feel more positive about using that information system. Indeed, following research on the determinants of information system success (e.g., DeLone & McLean, 1992; Seddon, 1997) and the literature on technology acceptance (Davis, Bagozzi, & Warshaw, 1989) a system that is easy to use allows users to save time and effort, which instead may be invested in improving their task performance. Perceived ease of use is therefore likely to contribute to a perceived improvement in task performance, which makes the system appear more useful (Schillewaert, Ahearne, Frambach, & Moenaert, 2005). Furthermore, over the past few decades, scholars have given considerable attention to investigating the associations between ease of use and the degree to which the user perceives using the information system is entertaining. For example, Hsu and Lu (2007) have empirically corroborated that systems free from effort promote intrinsic motivations such as fun and pleasure. According to Igarria, Igarria, and Maragahh (1995), through ease of

use the users are more likely to believe that they have a mastery over using the system, reinforcing the entertainment value the system provides to them. Mäntymäki and Salo (2011) find that ease of use is crucial to materializing both the utilitarian and hedonic benefits of VWs. Given the above reasoning, we posit the following:

H6. Perceived ease of use positively influences the perceived usefulness of a VW.

H7. Perceived ease of use positively influences the entertainment value of a VW.

3.4. Escapism

Escapism is an important characteristic of VWs as these worlds offer features that allow users to represent themselves digitally by using avatars (Gilbert, Murphy, & Ávalos, 2011). As conceptualized by Hirschman (1983), escapism has a utilitarian function since it relieves an individual of mental burdens. When users are so absorbed by the use of an IS that they escape reality, the perceived cognitive demands of performing a certain task are lowered. For example, in this state, users lose track of time and appear to have been able to finish their tasks faster than actually was the case (Saadé & Bahli, 2005), and show higher levels of creativity (Kohler et al., 2011). A system that provides escapism therefore is likely to be viewed as a useful tool to support the completion of the user's tasks. Accordingly, and predicated on the empirical results described by Saadé and Bahli (2005), it can be assumed that escapism will contribute to perceptions of usefulness. However, particularly in VW settings escapism not only contributes to perceptions of usefulness but also to impressions of entertainment (Jung & Kang, 2010). Individuals can be expected to find becoming immersed in the use of the VW and escaping reality amusing because it relieves them of their daily cares or boredom (cf., Close & Kukar-Kinney, 2009). Besides, in the form of a role-play and the avatars they use to represent themselves, individuals are not limited to their mere real life identities, and, thus are able to nurture their autonomy by creating their own new self-images and acting accordingly.

Thus, in line with the above we suggest:

H8. Escapism positively influences the perceived usefulness of a VW.

H9. Escapism positively influences the entertainment value of a VW.

3.5. Visual attractiveness

Following the literature on consumer marketing (e.g., Babin et al., 1994) visual attractiveness is assumed to trigger both extrinsic and intrinsic reactions. Drawing upon the Stimulus-Organism-Response Model (Mehrabian & Russell, 1974), Wang and colleagues (Wang, Hernandez, & Minor, 2010; Wang, Minor, & Wei, 2011) confirmed this bi-directional mechanism in explaining the usage of online shopping and online service systems. More specific support was provided by the website portal study of Van der Heijden (2003) which showed significant influences of visual attractiveness on perceived usefulness (extrinsic) and perceived enjoyment (intrinsic). Comparably, Cyr, Head, and Ivanov (2006) found perceived visual attractiveness to be an important antecedent of perceived usefulness and pleasurable system experiences in mobile commerce settings. When extending this line of reasoning to VWs it seems realistic to assume that the visual attractiveness of a VW contributes to its perceived usefulness and entertainment

value. VWs are visually attractive environments that lead to game-like experiences, which may influence the way tasks are completed and online time is spent. Therefore, and predicating on the above, it is conceivable to believe that ‘which is beautiful is useful and entertaining’. Thus, we hypothesize:

H10. Visual attractiveness positively influences the perceived usefulness of use of a VW.

H11. Visual attractiveness positively influences the entertainment value of a VW.

4. Method

4.1. Procedure and measures

An online survey design was applied to collect data. A sample consisting of 90,000 Dutch registered users of the VW Second Life was sent an e-mail inviting them to participate voluntarily in a web-based survey. The users were asked to click on a link in the e-mail, which led to our online questionnaire. The online questionnaire included the research constructs of our model and some socio-demographics (see Table 2).

We translated the questionnaire by using a combination of standard translation and back translation. A bilingual speaker whose native language is Dutch translated the questionnaire from English into Dutch. Then, a second bilingual speaker whose base language is English translated the questionnaire back to English. Afterwards, the two bilingual speakers and the members of the research team discussed the differences and slightly refined the translation to ensure its consistency (cf., Van Auken, Barry, & Bagozzi, 2006). Finally, a pre-test was conducted to assess the wording and interpretability of the questionnaire (cf., Rose, 1999). Five graduate students in the business administration curriculum of a Dutch university participated in the test. The participants were asked to evaluate the clarity and interpretability of the questionnaire. Using their suggestions, some minor modifications were made.

All scales used in the measurement were multi-item scales that were collected based upon previous literature (see Appendix). All items were part of reliable and validated measurement instruments. We made the scale items target specific, i.e., tailored them

to the context of VWs. Except for the attitude towards use (7-point semantic differential), all constructs were measured using 7-point Likert scales.

4.2. Sample

Eventually 846 respondents completely filled in the online questionnaire. Table 2 displays the sample demographics.

The demographics demonstrate that men and women were represented fairly equally. Most respondents were between 30 and 50 years old (58.5%, $n = 495$). Overall, the respondents considered themselves reasonably experienced in using Second Life. A majority (67%, $n = 567$) indicated that they used Second Life for purchasing purposes. To investigate whether non-response bias posed a threat to the external validity of the study, we compared the sample demographics with those of the population of Second Life users. A comparison with available user statistics (Second Life Wiki, 2011) demonstrated no large demographical differences. This finding indicated that non-response bias was unlikely to be an issue.

5. Results

5.1. Test of dimensionality

Exploratory factor analysis (EFA) was run using the principal components model with the oblique rotation technique (Direct Oblimin). The data passed the thresholds for sampling adequacy (KMO MSA 0.919, Bartlett's test of sphericity 18529.2 $p < 0.001$). Four items (see Appendix) were removed since they demonstrated high cross-loadings. The final factor solution was then derived. Together, the 7 factors explained 81.1% of the variance in the data. Unidimensionality of the measures was confirmed since each item loaded highest on its intended factor. Moreover, all items loaded very strongly on their underlying factors (>0.70 ; see Hair, Black, Babin, & Anderson, 2010). As such, preliminary evidence for convergent validity and discriminant validity was provided.

5.2. Measurement model

We tested the measurement model by running confirmatory factor analysis (CFA) with the maximum likelihood estimation (MLE) method using Amos 7 (Arbuckle, 2006). Except for the chi-square statistic² ($\chi^2 = 948.670$, $p < 0.001$), all fit indices demonstrated a good fit with the data (CMIN/df: 3.411, GFI: 0.92; AGFI: 0.90; NFI: 0.95; TLI: 0.96; CFI: 0.96, RMSEA: 0.053). As such, the results confirmed the dimensionality of the solution, and suggested convergent and discriminant validity. We further evaluated the convergent validity and reliability of the measures via the CFA factor loadings of the measurement model and by computing Cronbach's alphas, composite reliabilities, minimum item-to-total correlations and Average Variance Extracted (AVE) (Table 3).

All factor loadings, minimum item-to-total correlations and AVE's exceeded accepted rules of thumb for convergent validity (see Bearden, Netemeyer, & Haws, 2011; Devellis, 2012; Hair et al., 2010) and all Cronbach's alpha's and composite reliabilities surpassed the threshold values for reliability (see Devellis, 2012; Hair et al., 2010; Netemeyer, Bearden, & Sharma, 2003), reconfirming the validity and reliability of the measures. Finally, we conducted two additional tests of discriminant validity. First, we used the CFA output to study the within-construct item factor

Table 2
Sample demographics ($n = 846$).

Measure	Items	Frequency	Percent
Gender	Male	440	52.0
	Female	406	48.0
Age	<20	43	5.1
	20–29	118	13.9
	30–39	260	30.7
	40–49	235	27.8
	50–59	136	16.1
	60–69	45	5.3
Second Life experience	>69	9	1.1
	Very inexperienced	52	6.1
	Inexperienced	167	19.7
	Neutral	280	33.1
	Experienced	296	35.0
Frequency of buying digital products at Second Life	Very experienced	51	6.0
	Never	279	33.0
	Occasionally	270	31.9
	Regularly	210	24.8
	Often	87	10.3

² The chi-square statistic is relatively sensitive to large sample sizes. Other fit indices that are less sensitive to sample size are more useful to determine model fit (Bagozzi, Yi, & Phillips, 1991).

Table 3
Dimensionality, reliability and convergent validity statistics.

Construct (no. of items)	Factor loadings (EFA)	Factor loadings measurement model (CFA)	Factor loadings structural model (SEM)	α	Composite reliability	Minim. item-to-total correlation	AVE
Perceived usefulness (4)	0.89; 0.78; 0.91; 0.83	0.93; 0.89; 0.82; 0.71	0.93; 0.87; 0.81; 0.69	0.90	0.93	0.68	0.78
Entertainment value (4)	0.88; 0.72 0.85; 0.69	0.82; 0.83; 0.87; 0.72	0.82; 0.83; 0.87; 0.72.	0.88	0.92	0.66	0.74
Economic value (2)	0.90; 0.93	0.88; 0.81	0.79; 0.91	0.83	0.92	0.71	0.87
Perceived ease of use (4)	0.95; 0.95; 0.91; 0.94	0.91; 0.93; 0.91; 0.95	0.91; 0.93; 0.90; 0.95	0.96	0.97	0.87	0.89
Escapism (4)	0.82; 0.85; 0.88; 0.90	0.83; 0.90; 0.84; 0.81	0.83; 0.90; 0.84; 0.81	0.91	0.94	0.76	0.78
Visual attractiveness (4)	0.89; 0.89; 0.92; 0.92	0.85; 0.81; 0.93; 0.94	0.85; 0.81; 0.93; 0.94	0.94	0.96	0.81	0.84
Attitude towards use (4)	0.85; 0.88; 0.83; 0.90	0.83; 0.75; 0.89; 0.82	0.84; 0.74; 0.90; 0.88	0.91	0.94	0.73	0.78
Recommended value	>0.70	>0.70	>0.70	>0.70	>0.70	>0.50	>0.50

loadings and compared these loadings to across-construct item loadings. Since all within-construct item loadings were high, and lower than the cross-loadings, discriminant validity could be assumed. Then, we studied the individual AVEs and compared the scores with the squared correlations among the constructs (cf., Chin, 1998). As all AVEs exceeded the values of the squared correlations among the constructs in the corresponding rows and columns (see Table 4) discriminant validity was re-confirmed.

Finally, we tested for common method bias by conducting Harmon's single-factor test. First, we loaded all measurement items into one EFA (principle components analysis) and assessed whether (a) one single factor emerged or (b) one factor emerged that accounted for the majority of the variance. As the factor solution demonstrated more than one factor, and the first factor accounted for 39.8% of the variance, no indication for common method bias was found. Second, we conducted a CFA (Amos 7.0; MLE) to assess the fit of a single factor model (all items loading on one factor) and compared the outcomes with the fit indices of the seven-factor measurement model. The single-factor model demonstrated very poor fit ($\chi^2 = 10581.68$, $p < 0.001$; CMIN/df: 35.39; GFI: 0.45; AGFI: 0.36; NFI: 0.44; TLI: 0.39; CFI: 0.44, RMSEA: 0.202), which again indicates that common method bias was unlikely to be an issue.

5.3. Structural model

Structural Equation Modeling (SEM) was applied to estimate the structural model (Amos 7.0; MLE). Apart from the chi-square statistic ($\chi^2 = 953.23$, $p < 0.001$), all fit indices indicated a good fit

with the data (CMIN/df: 3.380, GFI: 0.92; AGFI: 0.90; NFI: 0.95; TLI: 0.96; CFI: 0.96, RMSEA: 0.053). We estimated the path coefficients (β) and R^2 values of the structural model. Table 5 shows the overall results, which are also summarized in Fig. 2.

Overall, the results strongly confirm the predictive power of the model. The amount of variance explained is rather high. The results indicate that, except for Hypothesis 10, all hypotheses are supported. To further assess the robustness of the structural model a post hoc mediation test was conducted. An alternative model was specified and ran (Amos 7.0; MLE) that extended our research model by adding direct influences of the four system specific VW beliefs (economic value, perceived ease of use, escapism, visual attractiveness) on the attitude towards using a VW. Even though the model fit indicators showed a comparable (good) fit to the data ($\chi^2 = 948.70$, $p < 0.001$; CMIN/df: 3.413, GFI: 0.92; AGFI: 0.90; NFI: 0.95; TLI: 0.96; CFI: 0.96, RMSEA: 0.053) none of the four added direct effects was significant in nature while the originally specified relationships kept their outcomes as reported on in Fig. 2. As such, the mediating structure as specified in the model was strongly confirmed.

It should be noted, however, that for three of the eleven hypotheses the β values are rather low, indicating weak relationship. The weak influence of economic value on entertainment value, although supporting the argumentation behind Hypothesis 5, suggests that this may not be a crucial variable here. Also, the relatively low β values found for Hypothesis 6 (perceived ease of use – perceived usefulness) and Hypothesis 3 (perceived usefulness – entertainment value) imply a weak contribution to explaining the independent variables. For these hypotheses, the results do provide support, but this support is rather weak.

Table 4
Discriminant validity: AVEs versus cross-construct squared correlations.

Construct	Perceived usefulness	Entertainment value	Economic value	Perceived ease of use	Escapism	Visual attractiveness	Attitude towards use
Perceived usefulness	0.78						
Entertainment value	0.23	0.74					
Economic value	0.17	0.18	0.87				
Perceived ease of use	0.09	0.19	0.08	0.89			
Escapism	0.26	0.31	0.13	0.06	0.78		
Visual attractiveness	0.13	0.37	0.16	0.11	0.14	0.84	
Attitude towards use	0.23	0.26	0.12	0.08	0.14	0.15	0.78

Note: The bold scores (diagonal) are the AVEs of the individual constructs. Of the diagonal are the squared correlations between the constructs.

Table 5
Hypothesis testing results ($n = 846$).

Hypothesis	Path	β	Significance
1	Perceived usefulness \rightarrow Attitude towards use	0.28	<0.001
2	Entertainment value \rightarrow Attitude towards use	0.43	<0.001
3	Perceived usefulness \rightarrow Entertainment value	0.11	<0.01
4	Economic value \rightarrow Perceived usefulness	0.23	<0.001
5	Economic value \rightarrow Entertainment value	0.08	<0.05
6	Perceived ease of use \rightarrow Perceived usefulness	0.12	<0.001
7	Perceived ease of use \rightarrow Entertainment value	0.20	<0.001
8	Escapism \rightarrow Perceived usefulness	0.40	<0.001
9	Escapism \rightarrow Entertainment value	0.31	<0.001
10	Visual attractiveness \rightarrow Entertainment value	0.38	<0.001
11	Visual attractiveness \rightarrow Perceived usefulness	0.07	n.s.

Note: All expected relationships are positive in nature; n.s. refers to non-significance.

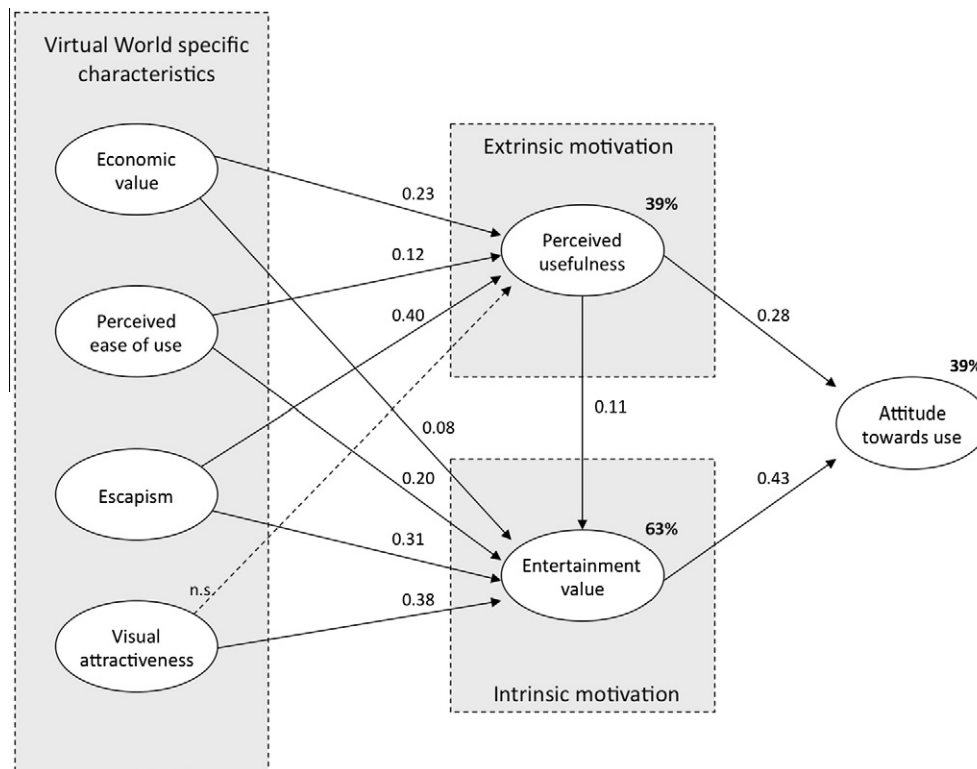


Fig. 2. Results structural model.

6. Discussion and conclusion

6.1. Key findings

Our research yields a number of key findings. First, the study reveals strong direct effects of the extrinsic motivation perceived usefulness and the intrinsic motivation entertainment value on the attitude towards VW usage. Together, these concepts explained a considerable percentage (39%) of the attitude variance, which supports the explanatory value of our model. Entertainment value was found to be the strongest predictor, which in turn was influenced by perceived usefulness. As such, our work provides support for the reinforcing effect of autonomous extrinsic motivation on intrinsic motivation, based on Cognitive Evaluation Theory. Second, we find that higher levels of economic value, perceived ease of use and escapism contribute to the perceived entertainment value and usefulness of VW systems. These VW-specific system characteristics function as second-order predictors of attitude,

their influences being fully mediated by perceived usefulness and entertainment value. This mediating structure corroborates findings of previous online motivation research (e.g., Eighmey & McCord, 1998; Roy, 2009), where usefulness and entertainment were labeled as principal motivations. Third, whereas visual attractiveness strongly influenced entertainment value, our results did not confirm our expectation that visual attractiveness also would contribute to the perceived usefulness of VWs. Although various sources (Cyr et al., 2006; Van der Heijden, 2004) did find a relationship between visual appeal and usefulness or usability, Hassenzahl (2004) claims that visual appeal (or “beauty”) of a product is strictly related to its hedonic attributes, and has little to no pragmatic value. In line with this, we conclude that visual appeal enhances the VW experience in terms of entertainment value, but has no effect on the more utilitarian value (or “pragmatic quality”, as Hassenzahl (2004) calls it) of VWs. The extent to which a VW helps a user in achieving personal tasks is not influenced by its visual appeal.

6.2. Theoretical findings

Past research on VWs has started to relate user motivations to behavioral attitudes and intentions. Most of this research, however, has either focused on general technology-perceptions (e.g., Fetscherin & Lattemann, 2008) or socio-psychological perceptions (e.g., Merikivi, 2009) as motivators behind the behavior. As these motivations were tested in models with a rather limited scope (e.g., Merikivi, 2009; Nah, Eschenbrenner, & DeWester, 2010; Shelton, 2010), the relationships between extrinsic motivation, intrinsic motivation, and potentially important system-specific characteristics were not considered. Contrary to these works, our study is one of the first to develop insights into the motivations behind VW usage by proposing a multipurpose motivational model of extrinsic motivation, intrinsic motivation, and system-specific perceptions as motivational basis. Our findings suggest that usage of a VW depends on a mixture of extrinsic and intrinsic motivation and, in line with self-determination theory (Deci & Ryan, 1985, 2000), confirm that both types of motivation function in conjunction.

At the system-specific level, we found that perceptions of economic value, ease of use and escapism function as important drivers of *both* extrinsic *and* intrinsic motivation to use a VW. This dual role corresponds with the cognitive-affective framework of consumer behavior, which has successfully been applied in a multitude of (online) consumption settings (e.g., Eroglu, Machleit, & Davis, 2001; Jiang & Benbasat, 2007; Oliver, 2010). This framework suggests that environmental cues may trigger both cognitive and affective reactions, which in their turn lead to behavior. This might explain why the studied characteristics of the VW environment may shape extrinsic (mostly cognition-based) and intrinsic (mostly affect-based) motivation. Furthermore, the dual role indicates that considering the value of system characteristic in terms of either their hedonic or utilitarian value (e.g., Huang, 2005) no longer seems to hold in VW settings. This observation corroborates with earlier works of scholars in the field of consumer studies (e.g., Hirschman & Holbrook, 1982; Holbrook, 1986), who stated that attributes of the object of consumption might have both hedonic and utilitarian benefits. Given the rise of VWs and various other MPIS, this notion seems to regain momentum.

From a modeling perspective, the explanatory power of our multipurpose-model advocates more comprehensive models when explaining and predicting MPIS usage. The parsimony of prior investigations of IT usage has given rise to much debate (see Plouffe, Hulland, & Vandenbosch, 2001; Venkatesh, 2000). To approach reality more closely, we modeled an integrated set of motivations and system-specific characteristics that function as underlying motivational mechanisms. The interrelatedness we found between extrinsic and intrinsic motivation, as well as their shared antecedents in terms of system-specific characteristics, supports the claim of Malhotra, Galletta, and Kirsch (2008) that we should look beyond the rather generic extrinsic–intrinsic dichotomy and explain system usage as a collection of interrelated motivations and underlying system beliefs. This is especially relevant for MPIS such as VWs, in which the distinction between extrinsic and intrinsic motivation may be less clear-cut than for information systems with an either utilitarian or hedonic function. Recent support for this assumption is provided by Lin and Lu (2011), who incorporated extrinsic and intrinsic motivation in their research model, to explain the use of Social Networking Sites. Although their model does not directly address the interrelatedness of these motivations, and thus seems to consider them as a dichotomy, they do find that the antecedents of both motivations are related. As the mix of extrinsic – such as enlarging one's social capital (Ellison, Steinfield, & Lampe, 2007) – and intrinsic motivations – such as friendship and identification (Barker, 2009) – is at the core of using social media, again a multipurpose perspective

which acknowledges the interrelatedness and inseparability of both motivations is likely to provide richer explanations of the use of upcoming applications.

6.3. Implication for business

From a business point of view the results of this study yield interesting implications for both the design and management of VWs. First, the corroboration of the fact that the influence of intrinsic and extrinsic motivations on VW usage is not a matter of either or, but instead go hand in hand, is useful in guiding both VW development and exploitation efforts. A single focus on entertaining features might be appealing for the traditional 'gaming' community, but leaves the opportunity to attract users that are interested in features that support them in achieving goals external to using the system itself underutilized. For example, providing electronic banking functions in a VW context can make boring administrative task more entertaining and stimulate VW usage of people that are not typically qualified as gamers. Additionally, providing features that are perceived as useful will not only directly influence usage, but also indirectly through enhancing the entertainment experience. VW design and exploitation efforts must be guided by a holistic approach that goes beyond the traditional 'entertainment' view and explicitly addresses features that are means to useful ends. Second, our findings provide handles for prioritizing the development of features associated to the VW characteristics addressed in this study. Due to its relative strong influence on both extrinsic and intrinsic motivation escapism deserves special attention in this context. Implementation of features that support users to escape from reality, like functions to customize and enhance avatar appearance, appears to be more important than investments in features that make the system easier to use. According to our findings, the support of economic activities is another way to stimulate VW usage. This implies that the design of VWs must foresee in mechanisms that allow its residents to exchange value through virtual goods and currency. Examples of these mechanisms are ownership transfer functions, virtual bank accounts, and functions that make it possible to convert VW currency into real life money. Additionally, operators of VWs can develop visual attractive shopping malls because shopping is recognized to be a venue to escape from reality as well as getting good value for money (Babin et al., 1994).

6.4. Limitations and recommendations

A potential limitation of this study is that we examined only one VW, namely Second Life. While the functions and features of Second Life are comparable to those of other international VWs such as The Sims Online, There and Active Worlds, we advise researchers to re-investigate and cross-validate the research findings, preferably rigorously, using different data sets collected in several VWs with disparate properties.

Another limitation concerns the theoretical base we used to relate VW characteristics to user motivations and behavioral attitudes. While we demonstrated that motivation theory is a solid frame to explain behavior in VW settings, other paradigms may result in additional explanations for the interrelationships between motivations and behavior. From this perspective it would be interesting to study the relative contributions of different research perspectives in combined models (cf., Van der Heijden, Verhagen, & Creemers, 2003). A combination between motivation theory and a technology acceptance perspective (cf., Mäntymäki & Salo, 2011; Shin, 2009; Yeh et al., 2011), for example, might be of interest.

A third limitation is the usage of a sample embedded in Western culture. Scholars in the fields of IS research (e.g., Al-Gahtani, Hubona, & Wang, 2007; Straub, Loch, & Hill, 2001) have warned

us that cultural differences are likely to affect IS usage. For example, in comparing collectivistic versus individualistic cultures, Davis, Wang, and Lindridge (2008) demonstrated that online consumers in collectivistic societies suppress the exploration and expression of emotions. In such settings, perceptions of pleasure can be assumed to have a relatively weak impact on online system use. Extrapolating this research finding to VW usage it is believable that the influence of intrinsic motivation may be weaker in non-Western cultures. Future research may test this assumption by cross-validating our research across different cultures.

A final limitation concerns the autonomous view on extrinsic motivation. Consequently, more controlled forms of extrinsic motivated behavior fell outside the scope of our research. A possible direction for theoretical extension is to build upon the continuum of self-determination (see Ryan & Deci, 2000a, 2000b) and compare the impact of extrinsic motivations for autonomous versus more controlled forms VW usage (e.g., attending obligatory courses or obtaining legal advice). Given that VWs as MPIS facilitate diverse behaviors this is likely to deepen our understanding of the roles and weights of the extrinsic motivations across multiple types of behavior.

7. Summary

This paper explores how and to what extent system-specific VW characteristics shape users' motivations and attitude towards using a VW. Making use of the literature on information system value, motivation theory, and a review of recent motivation studies in VW settings a research model is proposed and tested. The model poses economic value, ease of use, escapism and visual attractiveness as system-specific drivers of the attitude, mediated by extrinsic and intrinsic motivation. Characteristic for the proposed model is that it integrates relatively unexplored system-specific VW characteristics and addresses the multipurpose nature of VWs by including perceived usefulness and entertainment value as proxies for extrinsic and intrinsic motivation.

To test the model, an online survey study was conducted in which we collected data from 846 users of the VW Second Life. We used SEM (Amos) to analyze the data and estimate the model. The fit indices indicated a strong fit of the model with the data, providing evidence for the influence of the system-specific characteristics on the attitude, mediated by extrinsic and intrinsic motivation. A test with an alternative model containing direct influences of the four system characteristics on the attitude re-confirmed the mediating role of extrinsic and intrinsic motivation.

At the construct level, both perceived usefulness (extrinsic motivation) and entertainment value (intrinsic motivation) had significant direct effects on the behavioral attitude, whereas perceived usefulness also had a small though significant indirect effect via entertainment value on the attitude. These findings underline the multipurpose character of VWs and emphasize the interrelatedness between both types of motivation. When considering the influence of the VW specific characteristics economic value, perceived ease of use and escapism significantly contributed to the perceived entertainment value and usefulness of VW systems. Taking the magnitude of effects into account, escapism seemed to be strongest motivational determinant. The role of visual attractiveness seemed less unambiguous given an insignificant influence on perceived usefulness and a significant rather strong influence on entertainment value. It seems that visual appeal is strictly related to hedonic attributes of a VW, and has little to no pragmatic value.

Overall, the findings of our study underline the relevance of taking both extrinsic and intrinsic motivation into account when predicting and explaining VW usage. We extended self-determination theory as generic theory of human motivation to a VW context, and

demonstrated that extrinsic and intrinsic motivation function in conjunction. Except for visual attractiveness, which significantly influenced intrinsic motivation but had no influence on extrinsic motivation, both types of motivation also share the same system-specific determinants (economic value, ease of use, escapism). From a development perspective, the dual influence of these three system-specific characteristics implies that putting efforts in one of these elements is likely to result in a twofold stimulation of behavior, that is, via both extrinsic and intrinsic motivation. Given its relative strong influences escapism deserves special attention.

Appendix A. Measurement scales

*** = removed after EFA

Perceived usefulness (general) (seven point Likert scale ranging from highly disagree to highly agree (Hong, Thong, & Tam, 2006; Porter & Donthu, 2006; Van der Heijden, 2003)). Mean (SD) = 4.07 (1.349)

- (1) I find ⟨name virtual world⟩ useful in my life.
- (2) I find that ⟨name virtual world⟩ adds value to my life.
- (3) Overall, ⟨name virtual world⟩ is useful.
- (4) Using ⟨name virtual world⟩ does not help me accomplish things more quickly. (reverse)
- (5) Using ⟨name virtual world⟩ makes my life easier.***
- (6) Using ⟨name virtual world⟩ can make one productive.***

Entertainment value (seven point Likert scale ranging from highly disagree to highly agree (Mathwick et al., 2001; Richard, 2005)). Mean (SD) = 5.64 (1.004)

- (1) I think ⟨name virtual world⟩ is very entertaining.
- (2) The enthusiasm of ⟨name virtual world⟩ is catching, it picks me up.
- (3) Using ⟨name virtual world⟩ does not entertain me (reverse).
- (4) I think ⟨name virtual world⟩ is exciting.***
- (5) I think ⟨name virtual world⟩ is imaginative.

Economic value (seven point Likert scale ranging from highly disagree to highly agree (Mathwick et al., 2001)). Mean (SD) = 4.25 (1.132)

- (1) The products that can be bought in ⟨name virtual world⟩ are a good economic value.
- (2) Overall, I'm happy with the prices of the products in ⟨name virtual world⟩.
- (3) The prices of the product(s) I purchased in ⟨name virtual world⟩ are too high, given the quality (reverse).***

Perceived ease of use (seven point Likert scale ranging from highly disagree to highly agree (Hong et al., 2006; Porter & Donthu, 2006)). Mean (SD) = 4.46 (1.482)

- (1) Learning how to use ⟨name virtual world⟩ is easy.
- (2) ⟨name virtual world⟩ is clear and understandable to use.
- (3) It is not easy to become skilful at using ⟨name virtual world⟩ (reverse).
- (4) Overall, ⟨name virtual world⟩ is easy to use.

Escapism (seven point Likert scale ranging from highly disagree to highly agree (Kim & Kim, 2005; Mathwick et al., 2001)). Mean (SD) = 4.64 (1.491)

- (1) Using ⟨name virtual world⟩ does not make me feel like I am in another world. (reverse)

- (2) Using ⟨name virtual world⟩ “gets me away from it all”.
- (3) I get so involved when I use ⟨name virtual world⟩ that I forget everything else.
- (4) Using ⟨name virtual world⟩ truly feels like “an escape”.

Visual attractiveness (seven point Likert scale ranging from highly disagree to highly agree (Mathwick et al., 2001; Van der Heijden, 2003)). Mean (SD) = 5.44 (1.033)

- (1) The way things are displayed in ⟨name virtual world⟩ is attractive.
- (2) ⟨name virtual world⟩ is aesthetically appealing.
- (3) I do not like the way ⟨name virtual world⟩ looks (reverse).
- (4) Overall, I find that ⟨name virtual world⟩ looks attractive.

Attitude (seven point Likert scale ranging from highly disagree to highly agree (Moon & Kim, 2001)). Mean (SD) = 5.30 (1.053)

- (1) Using ⟨name virtual world⟩ is a good/bad idea.
- (2) Using ⟨name virtual world⟩ is a foolish/wise idea (reverse).
- (3) Using ⟨name virtual world⟩ is a pleasant/unpleasant idea.
- (4) Using ⟨name virtual world⟩ is a positive/negative idea.

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