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Interactive effects of individual and group level variables on virtual purchase behavior in online communities

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Abstract

Focusing on social network theories, we examine the interactive influence of both group-level (i.e. community influences) and individual-level variables (intrinsic and extrinsic motivations) simultaneously as the drivers of Massively Multiplayer Online Role-Playing Game (MMORPG) players' virtual purchase behavior. We demonstrate that several aspects of real-world behavior are reflected in virtual purchase behavior. Notably, normative interpersonal influences and community identity are critical drivers and moderators of virtual purchases. Moreover, clear advancement and enjoyment opportunities offer important triggers for virtual purchase behavior. This study provides insights for game developers to increase virtual purchases, and identifies domain-specificity of each gaming platform.

Key words: Virtual consumption, Massively Multiplayer Online Role-Playing Games, social network theory, online communities, extrinsic and intrinsic motivation, structural equation modeling.

Introduction

Since the mid-nineties online consumers have embraced internet product purchasing, commencing predominantly with tangible goods, such as books from Amazon, and progressing to intangibles, exemplified by music from iTunes. More recently this trend has grown to include the purchase of virtual goods, with over US$2.3 billion spent in 2011 in the United States alone [1] and an overall revenue generation of approximately US$6 billion [2]. Virtual purchases grew from the evolution of online games within virtual worlds and first emerged in 1999 in player-to-player trade of virtual possessions [3] in Massively Multiplayer Online Games (MMOGs). These self-contained, three-dimensional virtual reality games (e.g. Happy Farm, Monkey Quest, Active Worlds among others) combine a highly active, socially interactive environment with the enjoyment of game playing. MMOGs cover a range of genres that encompass sociality, strategy, action, or building, involving large numbers of simultaneous players [4] forming a complex online community. One of the fastest growing forms of the virtual electronic game community is the Massively Multiplayer Online Role-Playing Games (MMORPGs), which have fueled a multi-billion-dollar virtual economy [5].

MMORPGs (such as World of Warcraft (WoW), Aion, Runescape, and Lineage) are of interest in the management and information technology literature, not only in relation to social networks but also in terms of the market value they generate through the production of virtual commodities and currencies. Supply and demand for virtual products also impact on the real economy when they become desirable enough to be sold on auction sites such as eBay. More recently, the growth of this market has been driven by game operators selling virtual products directly to players [3]. The rising material economies of MMORPGs are therefore real, and merit investigating as an important phenomenon of online consumption.

Of special importance is the following question: “Does the virtual economy-based purchase behavior demonstrate an extension of real-world behavior?” This question has been explored from

the perspective of offline–online comparisons, technology adaptation [6], gender differences [7], self-presentation [2], and online experiences [3,8,9]. However, by employing three aligned social network theories, namely Social Network Theory, Social Influence Theory and Kohler's Motivational Gains Effects Theory, this paper offers an exploration that delves deeper into the extent to which group-level (i.e. community influences) and individual-level (i.e. a gamer's intrinsic and extrinsic motivations) constructs influence the purchase of in-game accessories. For example, it has been well established in the extant literature that consumer purchases are significantly influenced by the community to which consumers wish to belong [10], measured here by theories of: fitting-in behavior [11] and normative interpersonal influences [12]. The world of MMORPGs is comprised of numerous online guilds and networks, of which individuals become a part and play games together. Hence, this study asks: "Will normative interpersonal influences and community identity influence virtual purchase intentions among online community members?"

Existing literature has established that intrinsic and extrinsic motivations significantly influence consumer purchase intentions online (e.g. [13,14]). However, in their review of cognition and motivation, Cosmides and Tooby [15] argue that external and internal regulatory motivational influences are domain-specific and that component-level generalization should be approached with caution. This is further echoed in recent calls for more research on the motives behind virtual item purchases [16,17], as these issues have not been fully addressed in the existing body of literature [2,18]. Further, Lee [19] has called for more interpersonal influence research to be undertaken in multi-player games.

Consequently, this study focuses on examining both individual- and group-level influences on intentions to purchase virtual in-game items. In doing so, the study offers several important theoretical contributions. First, the role of individual-level intrinsic and extrinsic motivations in driving virtual purchase intentions highlights the psychological drivers that underpin individual

engagement with virtual purchases. Second, the importance of group-level community influence variables (i.e. normative interpersonal influences and community identity) provide a better understanding of the role of group influences in a multi-player interaction context. Third, in examining the interactive effects of individual- and group-level variables, this research uncovers the social influence dynamics that drive virtual purchase behavior. Thus, the study offers substantial contributions in relation to the extension of real-world behaviors that are reflected in the virtual economy. The research also offers a number of managerial contributions that can help game developers in driving growth and their overall share of the virtual economy.

Literature review

The following literature review begins with an examination of online communities, followed by an outline of MMORPGs, prior research on virtual-world purchase behavior, and an overview of Social Network Theory, Social Influence Theory and Kohler's Motivational Gains Effects Theory in terms of how these theories relate to virtual purchasing research.

Online communities

Rheingold [20] defines virtual or online communities as "social aggregations that emerge from the Internet when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace". Online communities organized around a matter of interest tend to unite individuals who have never met, and are unlikely to meet, in real life. In that respect then, virtual communities are demographically diverse, yet the shared interest has a strong unifying power [21]. Furthermore, this diversity can be important for the success of a virtual community as members play different roles to sustain and grow the community [22].

Where these online communities are similar to real-life groups is in the shared interest/goals, shared values, membership norms, and prolonged social interaction [23]. This concept of shared goals, values, and network building is of particular interest to this paper given its link with virtual purchase intentions. This research argues that MMORPGs reflect all four human needs of community – transaction, interest, fantasy, and relationship [24] – and therefore act as an important exemplar for research on virtual product purchasing.

Research on online communities also addresses the consumer power generated by the social relationships and bonds made between members [25], which is particularly evident in the online environment [10]. Guo and Barnes [8] argue that the form of consumer empowerment generated from online communities provides a heightened ability for seeking and sharing information, and thereby creates value for consumers. In the case of MMORPGs, the social ties developed between players are likely to play an important role in their transaction behavior.

Massively Multiplayer Online Role-Playing Games

A report by Strategy Analytics [26] forecasts that there will be one billion virtual world and massively multiple online (MMO) users in non-gaming contexts by 2018. In the gaming arena MMORPGs are one of the most popular game genres and millions of players enjoy these games [27].

Played over the Internet using PCs and game consoles, MMORPGs usually evolve around a theme that defines the goals of the game. They are characterized by an "open-ended and broad nature", which means "ever-increasing possibilities for action within them". In fact, MMORPGs have evolved far beyond mere online gaming environments into highly complex communities that have economic and cultural implications in the real world [5]. These commercially successful, networked virtual environments are rapidly expanding both in terms of user involvement and

revenue generation [28]. Players, represented by avatars, simultaneously play in an evolving interactive game that provides new experiences for gamers in a "persistent social and material world" [4].

Park and Lee [29] state that there are two types of business models in the online game market: subscription-based models and free-to-play models. Regardless of the type of business model, players are still required to purchase virtual items, such as swords, guns, or clothing, to improve their avatar's powers or appearance to achieve game goals. A new hybrid model also seems to be emerging within the MMORPG market that combines both subscription-based and free-to-play models. For example, to attract new players, Blizzard Entertainment, the owner of WoW, recently decided to let players play 20 levels of the game for free [30]. After that, players are asked to pay subscription fees.

As game goals are difficult to achieve individually, players seek to become part of online communities for social game play, where they communicate, share experiences, and adopt social roles within a fictional setting. In these roles players may perceive a need to purchase virtual in-game accessories that provide advantages for themselves and other players in their community to achieve goals. As part of the game culture players seek to become part of online communities, or guilds, for social game play and to complete tasks more efficiently. These guilds comprise of players with similar interests and goals, and provide social interaction, assistance with quests, and protection from any rival factions. They may even accept donations from members. Hence, online communities in MMORPGs operate through a complex social web of connections among multiple players, creating an interesting interaction of group- and individual-level variables.

Prior research on virtual-world purchase behavior

The literature relating to purchasing behaviour in virtual worlds reveals that a variety of motivations have been identified since the mid-2000s when virtual goods sales became legitimatised. Yee's [31] work in developing an empirical model of player motivations in online games led the way for research relating to motivations for virtual purchases. His three overarching components of achievement, social, and immersion have been influential in studies employing customization and advancement in the game as motivators for virtual purchases (e.g. [8,32]). Guo and Barnes [8,33,34] extended this research with both qualitative and quantitative research. Qualitatively, they found effort expectancy (degree of ease); performance expectancy (subjective probability of success on a task); and the quality of the virtual world, social influence, personal real resources, and virtual item resources. Quantitatively, within the context of Second Life and WoW, they discovered that extrinsic motivators (effort expectancy, performance expectancy, and perceived value) as well as intrinsic motivators (perceived enjoyment and character customization) were significant motivating factors. Notably, these authors found that social influence was not a significant motivator in either of their studies for virtual purchase intentions.

Popp et al. [35] also provided a grounding for virtual-world research by proposing three motivations for participation: community-related, brand-related and value added. Along these lines, Lin [32] paid specific attention to virtual-world purchasing behaviour within games, and discovered motivations related to satisfying inherent desires, fulfilling manipulated desires, as well as community identity and communication to improve their game achievements. The issue of manipulated desire is of particular concern to some in the gaming community, who resent the game developers for luring players to pay for virtual items in order to advance in the game and build avatar status. Hota and Derbaix [36] examined MMORPG communities relating to children and found similar results in that motivations included enhancing the team, added value, and interpersonal influence.

Hamari [37] investigated purchase intentions for virtual goods in three free-to-play games and the results regarding enjoyment of the game differed from Kim [38] in that the former found game enjoyment actually reduced virtual purchase intentions while the latter found no significant relationship. Attitudes towards virtual goods and beliefs regarding peers' attitudes, however, were found by Hamari [37] to strongly increase willingness to purchase. Similarly, in the context of cosmetic virtual product purchases, Yilmaz [39] observed that product involvement in terms of attitude towards virtual goods was a significant factor. Given the disparity in findings relating to perceived enjoyment, our research addresses this factor rather than product involvement.

Focusing on social identity and online social capital, Kay et al.'s [40] research considers how gamer identity and social capital mediate between MMO involvement and psychosocial outcomes. While their study does not address virtual online purchases as outcomes, the findings relating to how players' bonding and gamer identity lead to self-esteem, social competence, and decreased loneliness provide a sound basis for understanding underlying factors for micro-transactions in games. Given that previous research has suggested that purchasing virtual items can enhance identity and status within games, the study of community identity is important.

This paper extends the previous research on virtual product purchases by comparing the influences of psychological drivers, group-level community influence variables and social influence dynamics through the lenses of Social Influence Theory, Motivational Gains Effect Theory, and Social Network Theory. The following section details the theoretical underpinnings to this research.

Theoretical underpinnings

Social Influence Theory [41] has been used widely in collective settings, such as virtual communities and other online settings, and entails three distinct processes: the role of compliance

(social norms), internalization (group norms), and identification (social identity). Accordingly, it provides a sound basis for underpinning this research regarding differences between individual-level and group-level influences on purchase intentions. At the group level, compliance may play a role in how a player seeks approval from their gaming group in terms of virtual purchases. Internalization as part of social influence occurs when a player shares goals and values with other players in their group, and acts according to the group norm [41]. Finally, identification relates to a player's self-awareness of their membership in a group and the significance of this attachment to the group. Stronger identification with the group is likely to influence game behavior and intentions to purchase virtual items.

Similarly, Kohler's Motivational Gains Effects Theory holds that task motivation in performance groups will increase when individuals are: (a) less capable than fellow group members, and (b) their efforts are particularly indispensable for group success [42]. The main motives for working harder when in a group have been identified as: social comparison (matching everyone else), successful competition (desiring to win), and indispensability (not wanting to let the team down). Research on the Kohler effect [43], in relation to computer-supported groups, found that group members' motivation and performance was high and exceeded the baseline of individual work when the individual's contribution was important to the group.

One of the most potent ideas in the social sciences is the notion that individuals are embedded in thick webs of social relationships and interactions [22,44]. Social Network Theory proposes that individuals within the teams, which have the same composition of member skills, can perform very differently depending on the patterns of group-level influences and relationships among members [44]. Similarly, at the individual level (i.e. node), outcomes and future participation in team activities will depend on the interaction between the group and individual characteristics. The Network Theory of Consumer Participation in Virtual Communities focuses on two specific approaches. One approach proposes that a number of individual-level and group-

level variables act separately to influence consumers' desires and participation [45]. However, based on the theories of mutual interest and collective action [46], an alternative approach postulates that both individual- and group-level variables act simultaneously as important drivers of virtual community participation. Informed by the findings relating to the Social Influence Theory and Motivational Gains Effect Theory, and integrating it with the Social Network Theory, our approach aligns with the latter stream of research that posits the interaction between individual- and group-level variables. Based on this approach, in the following section we develop our conceptual framework and hypotheses, involving direct and interactive effects of group- and individual-level influences on virtual goods purchase intentions.

Theoretical model and hypotheses

Group-level variables: community influence

As members of a virtual community, players in MMORPGs have strong ties with other players, particularly in those games such as WoW, where they become members of a guild in order to work together and achieve goals. In situations where acquiring new virtual items can enhance the chances of success, the influence of other players is likely to act as a driver. Research suggests consumers' consumption experiences are strongly influenced and shaped by their social environment and interpersonal influences [12]. In this regard, we focus on two pertinent social drivers of virtual purchase intentions, namely: normative interpersonal influence and community identity.

The acquisition and use of products and brands has been observed as one of the prominent methods of gaining status and enhanced image [47,48]. In line with Kohler's theory, players may show a strong desire to acquire and impress other players, and conform to others' expectations by matching everyone else, succeeding competitively, and not letting their team down regardless of

their level of capability. Brignall and Van Valey [49] argue that elements of player interaction can reinforce the desire to accumulate and consume various objects, such as money and weapons. It is therefore suggested that normative interpersonal influence may act as a significant driver of virtual purchase intentions.

Normative interpersonal influence is described to be the tendency to conform to others' expectations [50] and can be separated into two types of influence: value expressiveness and utilitarian influences. Value expressiveness is motivated by an individual's desire to enhance or increase their self-concept through referent identification, while utilitarian influence is reflected by an individual's compliance with the expectations of others to achieve rewards or avoid punishment and also operates through compliance. A large number of studies have discovered the positive power of interpersonal influence on consumers' product choices and brands from shopping behavior [51] to mobile internet services [52].

Current research on normative influences, however, presents an inconclusive picture. Past research on normative influences in MMORPGs has addressed gaming communities such as Pet Society, Second Life, and WoW. Notably, Guo and Barnes [8] and Lim and Seng [53] found that social influence was not a significantly influential factor in making virtual purchase decisions, while Shelton's research on Second Life [54] showed that players who were higher in social/entertainment motivations purchased more recreation/entertainment products. Given the inconsistency in findings, the current study posits that this antecedent requires further consideration in relation to community influences. Moreover, in line with the theoretical argument derived from Social Influence Theory and the Kohler effect, it is hypothesized that:

H1: Normative interpersonal influences will positively impact virtual purchase intentions in MMORPGs.

Community identity, defined as "the member's conscious knowledge of belonging and the emotional and evaluative significance attached to the membership" [45], is also a key component in influencing players' consumer behavior. Community identity allows a member to reflect on the shared social lives of community members and connect with others who share common interests. This can result in a member feeling pride in participating in community activities. According to Social Identity Theory, attachment in a group arises in two ways: group identity (identification with the group's purpose) [55] and through interpersonal bonds (attachment to individual members of the community). Ren et al. [56] discovered that strong group identity increased willingness to help the group. Hsu and Lin [57] employed this construct in their research on blog usage and also found it to be positively significant. Based on the above discussion, we posit that the emotional attachment and belonging relating to community identity will drive community members to invest in virtual item purchases. Thus, this study proposes that community identity, relating to pride, participation, and sharing of social lives, will also increase players' intentions to purchase virtual items:

H2: Community identity in MMORPGs will positively impact virtual purchase intentions in MMORPGs.

Individual-level variables: virtual intrinsic and extrinsic motivations

Researchers have argued that both intrinsic and extrinsic motivations play an important role in virtual environments [13,58]. Following Shin [58], intrinsic motivation is defined as the performance of an activity for no reason other than the process of performing it, and extrinsic motivation as behavior prompted by a user's need to interact with external entities. Past research addressing drivers for virtual item purchases [3] suggests that simple performance advantages for the game and new functionalities are strong influencers. Other factors include hedonic attributes,

such as aesthetic pleasure and background fiction, combined with social attributes linked to cultural references, branding, and rarity.

A considerable number of studies have looked at the role of intrinsic and extrinsic motivations in technological environments. For example, Igbaria [59] examined three main motivations affecting technology acceptance: (a) intrinsic motivations including enjoyment and entertainment, (b) extrinsic motivations such as usefulness, and (c) social pressure. These constructs have been further tested in a variety of technology contexts, including cellular phones [60], video games [61], and virtual environments [8,33,34]. However, given the continuously changing nature of platforms and gaming interactions fueled by technological advancements, scholars including Jung and Kang [16] and Zhou et al. [17] have highlighted the need for more empirical research on virtual goods purchase motivations. In addition, owing to domain specificity differences [15], the virtual goods economy requires further research to enhance our understanding of gamer engagement [18]. The domain specificity differences in the gaming arena are substantial because of the nature of the games themselves. For example, Sim City and Second Life are predominantly focused on gamers living a parallel reality, while games such as WoW and Lineage are centered on fantasy worlds wherein gamers – as avatars – strategize to overcome barriers and challenges. This research posits that the nature of the gaming platform will change the motivation for engagement.

As discussed in the literature review, Guo and Barnes [62] identified six key factors that influence virtual purchasing in their exploratory qualitative research on purchase behavior in virtual worlds. and later tested a conceptual model in Second Life [8]. They found that effort expectancy, performance expectancy and perceived value as extrinsic motivators together with perceived enjoyment, advancement, and customization as intrinsic motivators were significantly related to general purchase behavioral intention.

Following earlier studies, this research focuses on three important intrinsic motivation variables: perceived enjoyment, customization, and advancement. Focusing on hedonic systems, such as games, van der Heijden [63] argues that perceived enjoyment is a critical driver of success for these systems. Indeed, Dickinger et al. [60] claim that the fundamental reason for playing games is to enjoy them. Perceived enjoyment relates to the experience within the virtual world and is likely to encourage players to chase advanced virtual items, which Guo and Barnes [8] suggest will result in virtual purchases.

Customization refers to the degree to which technology, goods, or services can be created, selected, or changed to comply with user preferences [64]. Customization enables gamers to create, select, and change their avatars to make the game play experience more enjoyable. Moreover, customization can help satisfy the unique needs of gamers by accommodating their distinctive user preferences. It also increases the feeling of presence and enjoyment, and creates higher levels of engagement [64]. In their qualitative exploration, Guo and Barnes [62] posit that this higher engagement through customization can also lead to higher virtual purchase intentions.

Advancement is the "desire to gain power, progress rapidly, and accumulate in-game symbols of wealth or status" [65]. While customization relates to the appearance of a gamer's character, which may encourage decorative virtual purchases, most MMORPGs require the acquisition of specific weaponry and tools to advance further in these games. Ducheneaut et al. [66] observe that advancement opportunity offered to gamers increases engagement and, more importantly, helps a gamer's status within the community. Thus, to gain power and move further within the game, gamers may increasingly purchase virtual items. Based on the above discussion it is proposed that:

H3: Perceived enjoyment offered by in-game accessories in MMORPGs will positively influence virtual purchase intentions.

H4: Customization offered by in-game accessories in MMORPGs will positively influence virtual purchase intentions.

H5: Advancement offered by in-game accessories in MMORPGs will positively influence virtual purchase intentions.

As stated earlier, extrinsic motivation relates to an activity for the achievement of goals/benefits external to the system–user interaction. In this regard, this study specifically tests outcome expectancy. Baker-Eveleth and Stone [67] identify outcome expectancy as the value of accomplishing a task, usefulness, and ease of use. They argue that consumers accept a technology-related system if they find the specific technology enjoyable, beneficial, easy to use, and whether it provides them with the capability to complete tasks. This paper posits that outcome expectancy will positively influence players to remain in the game and build relationships in the virtual community, thus increasing the likelihood of purchasing virtual items to increase their chances of goal achievement. Hence, it is proposed that:

H6: Outcome expectancy positively influences virtual purchase intentions in MMORPGs.

Interaction between group-level and individual-level variables

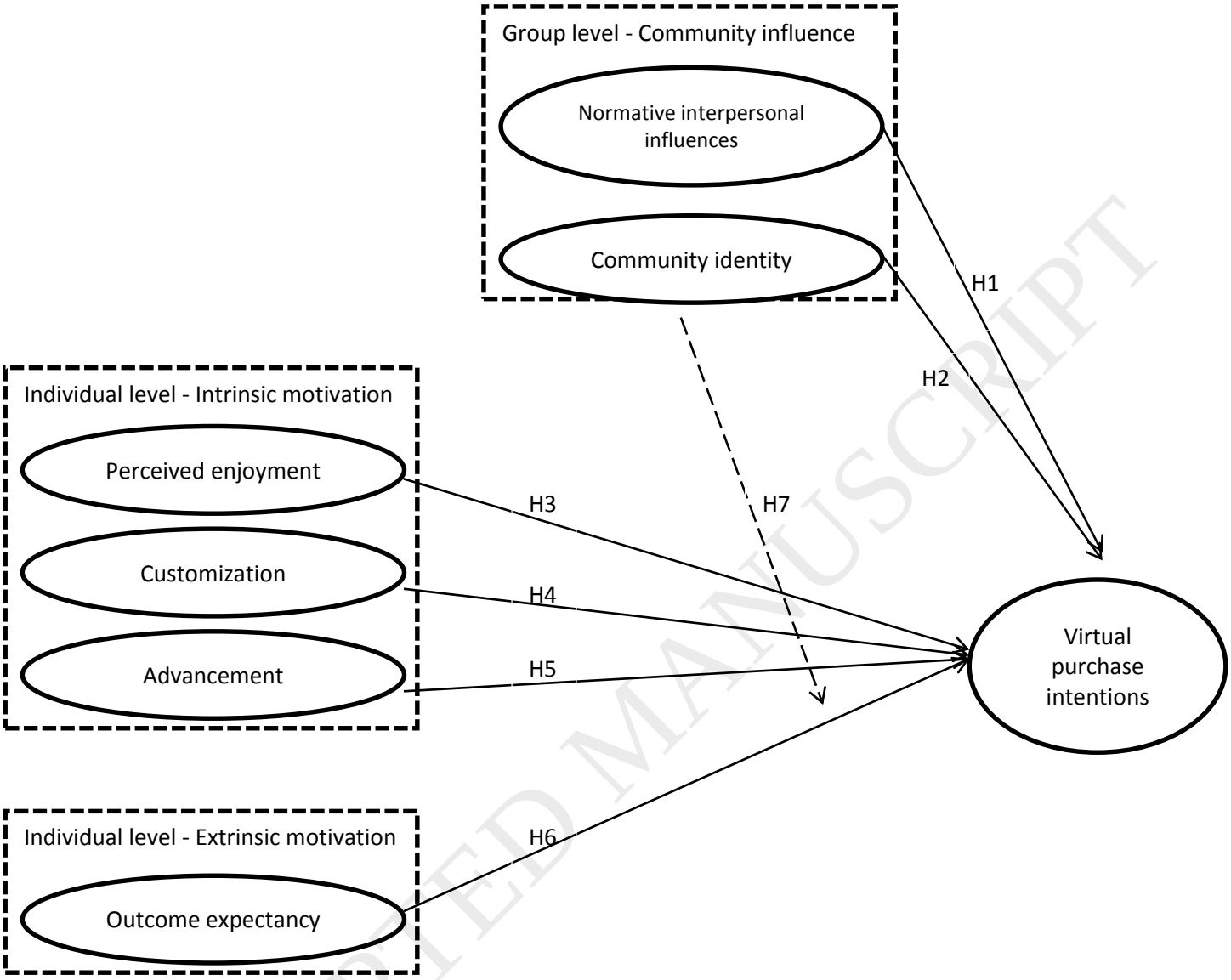
An important axiom of Social Network Theory is that an individual's position in a network determines in part the opportunities and constraints encountered. This is further reflected in the argument that an individual's investment in their human capital is determined by their social capital (i.e. community influence) [68]. Community members in MMORPGs communicate, share experiences, and adopt social roles within a fictional setting. A major part of this interactive communication is about accomplishing particular tasks, which can assist a member to move further forward within the game. Such communications can enhance a player's reputation within

and outside of the game, thus increasing their social capital. Hence, community members in MMORPGs regularly share how they accomplished a specific task and related information via user forums, blogs, and videos. This paper posits that, to gain a better reputation, senior members will follow other senior community members in spreading information about how to accomplish a certain task to help other guild members. In turn, the non-senior members will try and use this information to achieve higher levels and improve their status in the game to conform to the expectations of other members. As such, both types of members will identify themselves with the community. In this regard, community influence variables are likely to moderate the role between outcome expectancy and virtual purchase intentions. Thus, it is proposed that:

> H7: Community influence variables – that is, (a) normative interpersonal influences and (b) community identity – will moderate the relationship between outcome expectancy and virtual purchase intentions.

Overall, this paper extends the research on virtual purchasing in MMORPGs to address community influence, community identity, and both intrinsic and extrinsic motivation. In examining the group- and individual-level variables simultaneously, this study offers a more robust account of the social dynamics that drive virtual purchase behavior and demonstrates how real-life behaviors are reflected in the virtual economy. The conceptual model guiding this research is shown in Figure 1.

Figure 1 Conceptual model for drivers of MMORPG players' virtual purchase behavior



Methodology

Procedure and sample

A quantitative methodology employing a structured questionnaire was used to measure and validate the hypothesized relationships. The data were collected online using a professional survey website. Links to the survey were put on one of the university webpages and several gaming related forums (i.e. http://forums.mmorpg.com/; http://mmorpg.org.uk/forums/ and https://www.reddit.com/r/gaming/), and visitors were requested to participate in the survey. When

a respondent visited a particular website, either a link was made available already on the page or a link in the form of a pop-up appeared that requested a respondent to participate in the study. To avoid cultural invariance issues the survey was geographically locked (using IP addresses), wherein only consumers arriving at the webpages from the United Kingdom were requested to participate in the study. Respondents were filtered on the basis of their previous experience of playing MMORPGs. Those respondents who did not play MMORPGs were not included in the study due to the specificity of the context.

More than 1200 visitors to the websites over a period of five weeks were invited to participate in the study, of these visitors 539 (44.91%) clicked on the link and agreed to participate. The final suitable sample size was 358 (response rate = 29.83%), as many respondents did not complete the questionnaire. The respondent profile is provided in Table 1. Of the total respondents, 63.7% were male and 36.3% were female. The age group composition was predominantly young adults, which reflects the general player trend for MMORPGs. More than 50% of the respondents played MMORPGs regularly, with 40% of the total respondents having spent money on virtual accessories within the last 30 days.

Table 1 Respondent profile

	Frequency	Percentage
Age		
18–24	154	43.0
25–34	191	53.4
Above 35	13	3.6
Gender		
Male	228	63.7
Female	130	36.3
Playing frequency of MMORPGs?		
Everyday	63	17.6
3 to 6 days per week	117	32.7
1 or 2 days per week	98	27.3
Once per month	40	11.2
Less than once per month	40	11.2
Time spent on MMORPGs per week		

	Frequency	Percentage
Less than 1 hour	53	14.8
Between 1 and 4 hours	167	46.6
Between 4 and 10 hours	93	26.0
Between 10 and 30 hours	25	7.0
More than 30 hours	20	5.6
Last purchase of virtual accessories in MMORPGs		
Within this week	71	19.8
Within this month	72	20.1
Within this year	123	34.4
More than a year ago	68	19.0
Never	24	6.7
Money spent on virtual accessories in MMORPGs		
Less than 5 GBP	152	42.5
6–10 GBP	39	10.9
11–20 GBP	119	33.2
21–30 GBP	34	9.5
31 GBP and above	14	3.9

Measurement, validity, and reliability

Table 2 shows the scales used to measure the nine latent constructs. The normative interpersonal influences scale was adopted from Bearden et al. [12]. Each item was measured using a seven-point Likert-type scale, with "strongly disagree" to "strongly agree" as anchors. The community identity scale was adapted from Hsu and Lin [57] and measured through a five-point Likert scale. Perceived enjoyment was captured through the scale developed by Guo and Barnes [8] using a seven-point semantic differential measurement. Customization and advancement scale items were adapted from Guo and Barnes [8]. The items were measured using a seven-point Likert-type scale, ranging from "least important" to "highly important". Outcome expectancy was measured through a five-point Likert scale developed by Baker-Eveleth and Stone [67]. Purchase intentions scale items were adapted from Guo and Barnes [8].

Table 2 Measurement model

Construct and items	Factor loadings	AVE	CR	Cronbach's Alpha
Normative interpersonal influences [12]		0.85	0.90	0.93
I rarely intend to purchase in-game accessories until I am sure my friends approve of them	0.74			
If other gamers can see me using in-game accessories, I often intend to purchase the type they expect me to buy	0.84			
I like to know what in-game accessories make good impressions on others	0.82			
I will achieve a sense of belonging by purchasing the same in-game accessories that others purchase	0.85			
I often identify with other gamers by having the intention of purchasing the same in-game accessories they purchase	0.74			
Community identity [57]		0.56	0.73	0.77
Participating in MMORPG would enhance my chance to meet members who share the same common interests	0.73			
Members in MMORPG use it as a communication channel to share social lives and information	0.65			
I am so proud of being a member of MMORPG	0.68			
Perceived enjoyment [8]		0.81	0.87	0.88
I find in-game accessories to be…				
Enjoyable–disgusting	0.77			
Exciting–dull	0.88			
Pleasant–unpleasant	0.79			
Interesting–boring	0.72			
Customization [8]		0.82	0.88	0.88
How important is it for you that your character's appearance looks different from other characters within the MMORPGs?	0.83			
How important is it to you to pursue or design some personalized in-game accessories in the MMORPGs?	0.79			
How important is it to you that your character's armor/outfit looks fashionable in the MMORPGs?	0.78			
How important is it to you that your character has a unique style or appearance in MMORPGs?	0.81			
Advancement [8]		0.83	0.88	0.87
How important is it to you to acquire rare in-game accessories that most players will never have in MMORPGs?	0.75			
How important is it to you to own more in-game currency than other players within the MMORPGs?	0.91			
How important is it for you to be well known in the MMORPGs?	0.85			
Outcome expectancy [66]		0.76	0.85	0.89
Using in-game accessories saves me time in my tasks	0.70			
Using in-game accessories enhances my effectiveness in performing these tasks	0.66			

Construct and items	Factor loadings	AVE	CR	Cronbach's Alpha
Using in-game accessories increases my productivity	0.70			
Using in-game accessories makes it easier to do my tasks within the MMORPG	0.79			
Overall, I find in-game accessories useful in my MMORPG	0.80			
Purchase intentions [8]		0.86	0.90	0.90
I intend to purchase in-game accessory for my characters in MMORPGs.	0.89			
My willingness to buy a virtual item in MMORPGs is high.	0.85			
The likelihood that I would purchase virtual items in MMORPGs is high.	0.84			

$\chi 2$ (df) = 443.15 (293); RMSEA = 0.041; NNFI = 0.98; CFI = 0.99; SRMR = 0.042; GFI = 0.91

The items used to measure the latent constructs in the model show values above the recommended level for both composite reliability and average variance extracted (AVE). The Cronbach's alpha value was above 0.7, suggesting high reliability of the constructs. For all latent constructs the factor loadings were high and significant ($p < 0.001$), satisfying the criteria for convergent validity. Other fit indices were also above the recommended threshold value ($\chi 2$ (df) = 443.15 (293); RMSEA = 0.041; NNFI = 0.98; CFI = 0.99; SRMR = 0.042; GFI = 0.91). Discriminant validity was assessed using the test developed by Fornell and Larcker [69]. This test suggests that a scale possesses discriminant validity if the AVE of the underlying latent variable is greater than the shared variance (i.e. the squared correlation) of a latent variable with another latent variable. As Table 3 shows, this criterion was met by all the variables in the study: no correlation exceeds the square root of the AVE. The composite reliability (Table 2) was found to be above 0.7 across the constructs, exceeding the recommended threshold value, which also provides strong evidence of discriminant validity. The reliability and validity analysis results indicate that the constructs appear to have satisfactory measurement qualities. The totality of these tests provides strong evidence for the reliability and validity of the construct measures.

Table 3 Correlations matrix

	Normative interpersonal influences (NII)	Community identity (CI)	Perceived enjoyment (ENJ)	Advancement (ADV)	Customization (CUS)	Outcome expectancy (OUT)	Purchase intentions (PI)
NII	*0.92*						
CI	0.46	*0.75*					
ENJ	0.18	0.37	*0.90*				
ADV	0.44	0.49	0.45	*0.91*			
CUS	0.54	0.41	0.38	0.64	*0.91*		
OUT	0.30	0.25	0.40	0.28	0.25	*0.87*	
PI	0.61	0.56	0.38	0.47	0.42	0.43	*0.93*

** Note: Figures in italics represent the square root of AVE.*

To minimize the common method bias (CMB) [70], several recommended procedures were used. For example, the predictor and criterion items were alternated within the questionnaire version to achieve counterbalance and avoid order bias. To avoid response format bias, different question formatting was used. To reduce method bias, the respondents participating in the study were guaranteed anonymity and were asked to answer the questions as honestly as possible without thinking of any answer as wrong or right. While these procedural remedies may help in minimizing CMB, they may not eliminate it in its entirety. Additionally, it is difficult to determine the exact source or sources of the method bias. Thus, ex-post-statistical tests were conducted to examine the potential effects of CMB. First, a Harman single-factor test was carried out. The theorized factor structure accounted for 69.77% cumulative variance. In contrast, a forced one-factor solution following the Harman single-factor test accounted for only 30.47%, indicating that CMB is not a threat to the findings. As a further stringent CMB measurement, Lindell and Whitney's [71] marker variable approach to examine the correlations among constructs was employed. Perceived ease-of-use scale [72] was used to identify a common method factor as it was found to be not highly correlated with the dependent variables in the data. The correlations

did not change substantially (the average amount of change was 0.093) and the significance stayed highly consistent, suggesting common method variance does not create serious biases in the data.

Results

As stated earlier, two streams of research exist based on Social Network Theory that argue the separate [45] versus interactive [46] influence of individual- and group-level variables. To reconcile these differences we specifically conducted a model comparison that examined the separate versus interactive influence of individual and group variables. The proposed models were analyzed with the maximum likelihood estimator of LISREL 8.70 by using the covariance matrix of the measured variables as an input.

As can be seen from Table 4, moving from a model that only considers the influence of individual-level variables to a model that considers only group-level variables, the Chi-sq (df) decreased significantly (ΔChi-sq (df) = 54.56 (2)), with other fit measures also showing significant improvements (ΔRMSEA =-0.007; ΔNNFI = 0.01; ΔSRMR = -0.024). This demonstrates that the group-level variables framework offers a better structural explanation than the individual-level model. Furthermore, the theorized model offers an even more robust explanation as it offers a significantly better fitting model than a group-level model. Moving from M2 to M3, it was observed that Chi-sq (df) decreased significantly (ΔChi-sq (df) = 29.31(4)). In addition, the other fit measures also moved in the desired direction, offering a significantly better-fitting model (ΔRMSEA =-0.003; ΔCFI = 0.01; ΔSRMR = -0.007). The model comparison demonstrates that the theorized model, with simultaneous influence of individual- and group-level influences with interaction effects, offers a better-fitting model than a separate-effects model.

Table 4: Model comparisons

	Chi-sq (df)	Chi-sq/df	RMSEA	NNFI	CFI	SRMR
Model 1	527.02 (295)	1.79	0.051	0.97	0.98	0.073
Model 2	472.46 (297)	1.59	0.044	0.98	0.98	0.049
Model 3	443.15 (293)	1.51	0.041	0.98	0.99	0.042

* Model 1 – considers only individual-level influences; Model 2 – considers only group-level influences; Model 3 – theorized model

Table 5 provides the path coefficients and associated t-values for each hypothesis. It was observed that normative interpersonal influence has a significant influence on the purchase of virtual accessories in MMORPGs, thus supporting H1 ($\beta = 0.48$, $t = 8.28$). H2 is also supported, with community identity having a significant influence on purchase intentions ($\beta = 0.28$, $t = 2.91$). With regards to intrinsic motivation, H3 and H5, relating to perceived enjoyment ($\beta = 0.19$, $t = 2.71$) and advancement ($\beta = 0.12$, $t = 2.45$), are both supported. However, H4 is not supported, as customization was not found to be significantly influential in the purchase of virtual accessories. The extrinsic motivation variable, outcome expectancy (H6), has a significant influence on virtual purchase intentions ($\beta = 0.29$, $t = 3.47$). The interactions-related hypotheses are also worth noting. As hypothesized, the community influences variables (i.e. normative interpersonal influences and community identity) significantly moderate the relationship between outcome expectancy and virtual purchase intentions. However, the relationship direction was found to be different. The moderating influence of normative interpersonal interactions is negative ($\beta = -0.13$, $t = -2.22$), while community identity ($\beta = 0.26$, $t = 3.15$) is positively influential.

Table 5 Path coefficients

		Path coefficients	T-value	p-value	Result
Community influence					
H1	Normative interpersonal influences (NII)	0.48	8.28	0.00	Supported
H2	Community identity (CI)	0.28	2.91	0.00	Supported
Intrinsic motivation					

H3	Perceived enjoyment	0.19	2.71	0.01	Supported
H4	Customization	-0.05	-0.09	0.38	Not supported
H5	Advancement	0.12	2.45	0.01	Supported
Extrinsic motivation					
H6	Outcome expectancy	0.29	3.47	0.00	Supported
Interactions					
H7a	Outcome expectancy x NII	-0.13	-2.22	0.02	Supported
H7b	Outcome expectancy x CI	0.26	3.15	0.03	Supported

Discussion and conclusion

MMORPGs bring players together from all over the world on a single platform and help form a virtual community. Notably, a significant economy has emerged from players' purchases of virtual goods within this gaming platform. This paper addresses several calls for research in understanding the motives behind virtual purchase behavior [16], the need to understand interpersonal influence research in multi-player games [19], and the potential of community and interpersonal influence on online gaming behavior [73]. The study offers several interesting key findings in regard to the influence of group- and individual-level network variables, and interaction between these variables.

Group-level: community influence

With regard to community influence, a key finding was that normative interpersonal influences within MMORPGs are significant motivators for intention to purchase virtual items. The results demonstrate that online gamers attempt to conform to the expectations of significant others. The findings suggest that game operators who wish to drive game growth and their overall share of the virtual goods market should promote relationships between players, and should especially develop campaigns that highlight conformity. Along similar lines, community identity was found to be a significant influencer of virtual purchase intentions. This finding offers a strategic window of

opportunity for game developers. It suggests that game developers should provide as many opportunities as possible for members to interact within and outside the game to enhance community identity among their members. For example, game operators and vendors can take advantage of business opportunities made possible through community-related merchandising. It is therefore important that players are encouraged to share their social lives and opinions in order to develop bonds and loyalty within the community. Players who feel a sense of identification are more likely to instigate trades with other players, connect other players with each other for merchandising possibilities, and establish loyalty by collecting virtual items to assist the community. Based on Social Network Theory research findings [44], it is suggested that this increased identification would boost the total social capital of the game [68] and in turn influence players to invest more human capital (i.e. their time, consumption, and other resources). While many game operators offer merchandising they leave the communication between players to guild websites and other social networks. The study findings suggest that game operators should proactively engage in building a community identity among game members.

Individual level: intrinsic motivation

The influence of intrinsic motivation variables is also noteworthy. Results show that, of the three intrinsic motivators, both enjoyment and advancement were found to have a direct significant relationship with intentions to purchase virtual items. Earlier research opines that enjoyment is a key motivator for community members to engage in online games [18]. The study extends these findings by specifically targeting consumer perceptions of in-game virtual accessories as a driver for enhancing enjoyment. In line with earlier studies on intrinsic motivation in gaming communities [27], these results show that the enjoyment experienced in using virtual accessories encourages MMORPG community members to further accumulate in-game accessories to assist them in achieving their goal. As accessories are part of the user experience the

finding suggests that it is essential that game developers make virtual accessories enjoyable beyond their basic functionality in that they are exciting, pleasant to use, and interesting enough to keep the member entertained.

Yee [65] states that advancement will act as a key motive for gamers to purchase virtual goods. However, in their empirical study, Guo and Barnes [8] found a negative path between advancement and purchase behavioral intention. The results of this study support the notion put forward by Yee [65], wherein it is found that advancement is an important incentive for virtual goods purchase intentions. For example, obtaining a rare in-game accessory and more in-game currency that helps a community member advance further in the game is a strong motivator. An explanation for the inconsistency with Guo and Barnes [8] may be a result of the gaming domain itself. Guo and Barnes [8] used Second Life as their study domain; however, this game lacks elements such as gaining power, acquiring rare items, and gaining riches, which are significantly important in advancing in other gaming domains, such as WoW or Lineage. Therefore, whilst advancement motives may not be as relevant to online communities such as Second Life, they will, however, be critical for domains such as WoW and Lineage. In communities such as WoW or Lineage, by advancing to higher levels in the game a gamer gains status, power, and more resources, as well as mileage in terms of community respect. Thus, advancement will act as a significant intrinsic motivator for gamers in these types of online communities.

The findings on the influence of customization on virtual purchase intentions also offer interesting insights, as no statistically significant relationship is found. Thus, it can be concluded that customization does not help generate sales for virtual accessories. This finding contradicts the earlier observation by Guo and Barnes [8], who focus on Second Life where purchasing customized adornments for avatars may be more popular because each community member sets out to show their individuality and uniqueness as a means of enhancing their presence within their environment. In contrast, for gaming communities such as WoW and Lineage, belongingness to

the guild is paramount for survival and so the community member will strive to mimic their guild's attire and weaponry to cement their position within that online community. In this regard, purchasing virtual accessories that make the community member look too different from others could be disadvantageous.

Extrinsic motivation and interaction between variables

Results from this study indicate that outcome expectancy is a significantly influential variable. This has recently been reflected in the MMORPG domain, where many gaming companies that had paid membership models have decided to offer members free access to easier initial levels. The initial excitement built through achieving a specific outcome may motivate a novice player to become a paying community member by purchasing virtual accessories. Findings also show that outcome expectancy has a significant interaction effect on purchase intentions when moderated by community influence variables. While the moderating influence of community identity was positive, the normative interpersonal influence moderation was found to be negative. Two possible explanations – namely individualistic gamer personality and forced choice – may help explain this phenomenon. Each gamer – and their motivations for playing MMORPGs – is unique. An accessory that has become extremely popular among all other players may not necessarily appeal to a particular gamer. Hence, when societal pressure relating to an outcome is forced upon gamers it can cause alienation, and in turn create a negative reaction that leads to decisions by community members not to purchase a virtual accessory. Many game developers use tactics such as sending unsolicited emails and private messages on forums to gamers reaching a certain stage to entice them to buy virtual accessories and reach higher levels. However, as found in the results of this study, such tactics may backfire. This finding is in line with that of past research on consumer emotions [33], whereby unsolicited promotional communication by companies can cause consumer irritation and anger, which can lead to overt actions against an organization. Based on

Social Network Theory, it is recommended that gaming companies should promote inter-member dialogue as much as possible, which may then lead to a strong community identity, resulting in a significant increase in virtual purchases. The results also show that for an accessory to sell it should also possess clear advancement and enjoyment opportunities within the particular game; a gamer will be more convinced to buy a virtual accessory if the accessory can demonstrate it will help the gamer accomplish a particular task, will be enjoyable to use, and also help them move further up in the game.

Overall, from a theoretical lens, this paper contributes to the online consumption community literature in three ways. First, by empirically examining the drivers of MMORPG players' virtual purchase behavior, the study offers significant insights on how real-world behavior is reflected in the virtual economy. Second, by developing a model to measure the effect of group-level variables via normative interpersonal influence and community identity, and individual-level influences of intrinsic (i.e. perceived enjoyment, customization, and advancement) and extrinsic (i.e. outcome expectancy) motivation drivers to purchase virtual goods the study provides a richer explanation of how virtual-economy purchase behavior is similar or different to real-world behavior. Moreover, the research demonstrates the need to study the contextualization of the virtual economy, as the results vary from earlier virtual purchase studies that examine a different gaming domain [8]. The findings also demonstrate that each online gaming domain differs substantially in terms of user motivations, and thus generalizations of findings from one gaming domain to another should be approached with caution. The finding also offers further empirical support to the argument of domain specificity proposed by Cosmides and Tooby [15]. Third, using multiple social network theories to assess the moderating role played by community influence variables on extrinsic motivation the study offers a greater understanding of how social influence dynamics are reflected in the virtual economy.

Limitations and future directions

While this study offers interesting insights on drivers of virtual purchase intentions there are several limitations that highlight avenues for future research. Firstly, as reflected in the results, each gaming platform seems to demonstrate different motivations for virtual purchases. Hence, a study comparing the motivations of players on multiple platforms showing similarities and differences will be helpful. Secondly, each community member has a different personality, and this personality variable may moderate community members' motivation and engagement with a particular game. In this regard, examining the role of community member personalities may help game developers and community moderators to build better engagement strategies. Beyond gamer personality traits, an important future direction for further studies would be to examine conditions in which community influence variables can influence the intrinsic motivations of gamers. This will help set up boundary conditions for the interaction between community influence and motivation variables. Thirdly, the virtual gaming community is spread across the world and a cross-national comparison demonstrating the cultural influence on gaming and purchase behavior will be highly welcome in this respect.

In conclusion, this study shows that several aspects of real-world behavior are reflected in virtual purchase behavior, and also highlights the domain specificity of virtual purchase behavior. Notably, this study finds that normative interpersonal influences and community identity are more critical drivers of virtual purchases than individual-level intrusive motivations, contributing to the literature in this field.

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