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GENERAL RESEARCH

# What are users' intentions towards real money trading in massively multiplayer online games?

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**Abstract** This study investigates user behaviour in massively multiplayer online games from the perspective of their intentions to engage in real money trading. Players who engage in real money trading purchase resources instead of spending time to acquire them in the game. This behaviour influences not just their own gaming experience, but those of other players as well as the operator's revenues. We present an online survey which targets the players of World of Warcraft. Players' relationships with real money trading are investigated using insights from behavioural economics. We propose a model which includes a set of behavioural determinants grounded in empirical research on online games. The study's findings indicate that a player's social status and the disinhibiting effects of online play are positive influences on players' intentions to engage in real money trading, while perceived fairness, anticipated regret and uncertainty about the seller's behaviour are negative influences. Interestingly, neither the perceived enjoyment nor the potential punishments influence intentions.

**Keywords** User intentions · Massively multiplayer online games · Real money trading · Dual–self model

**JEL classification** L86 · D03

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## Introduction

Millions of people participate in virtual worlds, spending many hours, daily, playing games, chatting, or even engaging in business activities. Massively multiplayer online games (MMOGs) have become multi-billion dollar businesses for which the main revenue source is a monthly subscription fee. The recent impressive increase in the number of users in virtual worlds has attracted the attention of both researchers and practitioners. Since the mid-1990s, virtual worlds have evolved from controlled online environments, where developers closely determine player behaviour, to full-fledged economies in which scarce items are traded for virtual money (Guo and Barnes 2007). These in-game economies motivate many players to engage in activities to earn virtual money, but not all players want to spend their time on these activities. Players can circumvent the internal economy of a game by purchasing the items they wish to acquire for real money. This is known as real money trading (RMT) and such items are offered in various marketplaces (e.g., eBay) (Guo and Barnes 2007).

Research shows that RMT may create negative externalities and decrease operators' revenues (Castronova 2006). MMOG operators try to limit the amount of RMT through policy or through licence agreements that prohibit the activity, but their efforts have not been successful yet. The size of the RMT market was estimated at 2 billion US dollars (Heeks 2008). Besides, a number of players (22%) admit to having purchased virtual items (Yee 2005a). Law and policy researchers debate whether virtual assets should be treated as real-world assets (Fairfield 2005), or whether they should be subject to immaterial property rights (Passman 2008). Recent research efforts have focused on

determining the virtual assets' value (Manninen and Kujanpää 2007).

This study focuses on RMT when it is prohibited by the game rules and conducted by players outside the game's environment in a "black market". This activity is purported to de-motivate other players and decrease their positive game experiences, possibly even leading them to stop playing altogether (Nardi and Kow 2010). High value virtual items are game-generated and controlled. Once acquired by a player they do not reappear until the game's designers determine they should. This system works well as long as the "regular" players, i.e., people playing the game for the experience and not for generating income, are competing for the items. Once "gold-farmers", i.e., people playing the game as an income generating activity, take over, however, it becomes very difficult for regular players to obtain valuable items simply by playing the game. Instead, gold-farmers sell the valuable item through RMT. For the operator, the implications of RMT are not clear. These transactions do not generate direct revenue for the operator inside the game and could even result in lost revenues via reductions in monthly subscriptions if players progress more quickly through the game with the help of purchased items (Taylor 2002). On the other hand, players engaged in RMT may cover an unmet need while remaining in the game and RMT could conceivably generate future revenues for the operator.

The present study is based on the case of *World of Warcraft* (WoW), an MMOG developed and run by Blizzard Entertainment and in which RMT is forbidden by the game's rules. We investigate players' intentions toward RMT in this context. Despite the recent increase in empirical studies focusing on players' attitudes and behaviours in online games (e.g., see Journal of Virtual Worlds Research), research on economic transactions, such as RMT, is limited and this study is one of the first research attempts to investigate this topic. Guo and Barnes (2007) offered a conceptual model based on technology acceptance literature to investigate the determinants of player's intention to engage in RMT. While their study sets a useful framework to understand players' interactions with virtual worlds' elements, it is our contention that a player's decision to engage in forbidden RMT is driven by different behavioural determinants. Thus, we introduce theoretical insights from behavioural economics to investigate a new research topic and complement existing research on user behaviour in online environments. The research question, addressed in this study, is:

- What determines players' intentions to engage in RMT in a massively multiplayer online game?

The study's contribution is two-fold. First, we contribute to the user behaviour research of the Information Systems field by introducing a model based on behavioural economics to investigate users' intentions towards forbidden activities without legal punishment in online environments. Second, we offer practical insights to game operators by identifying the main determinants of players' intentions towards RMT. These insights may motivate operators to design new incentive schemes to deter the players from RMT.

The rest of this article is structured as follows. The next section offers a brief description of the empirical case study. The following section introduces the theoretical framework and presents the proposed model. Then, the research method is presented, followed by analysis and discussion. The article concludes by underlining the main findings and highlighting further research directions.

## World of Warcraft

WoW was launched by Blizzard Entertainment in 2004. Since then, the number of players has grown to exceed ten million.[1] The setting is a 3D medieval-fantasy world, inhabited by mysterious creatures. The player's experience starts with the creation of a character (avatar). The player selects from a number of races (e.g., humans, elves, and trolls) and a number of professions (e.g., warriors, mages, and hunters). Players fight the various monsters of the world (and sometimes each other) to gain experience points which allow their character to increase in level, becoming more powerful. The highest level attainable is currently 85, which takes a long time to achieve. Players also collect equipment such as armour and weapons and earn virtual money through various quests. Virtual money is used to buy virtual assets such as horses and other equipment. Players communicate with each other by typing words with the keyboard, using a voice-chat system, or participating in forums. Additionally, the player's character is able to perform various gestures (e.g., waving, dancing).

The game's world, Azeroth, consists of two continents. Players can freely travel from place to place by making their character walk, or by purchasing a boat ride or by riding a gryphon (a magical creature). The areas in the world are designed to challenge players at different levels. Each race has a city (e.g., Stormwind city for humans) where in-game businesses such as trainers, traders, and banks are available. The cities also have auction houses where players can trade virtual assets for virtual money. The currency in WoW is gold, silver and bronze, where 100 bronze coins make one silver coin, and 100 silver coins make one gold coin.

[1] http://www.worldofwarcraft.com/

The players are spread across a large number of servers running parallel versions of the world. Each server hosts around 20,000 characters. Servers come in two variations: on player versus environment (PvE) servers players can only fight the computer operated inhabitants of the world, while on PvP (player versus player) servers players can fight and kill each other as well. WoW runs in three parallel setups in the USA, Europe and Asia, which are slightly different (e.g., in language options, updates and launch time) and in which country-based price discrimination is applied in the monthly fees.

## Theoretical background

We use insights from behavioural economics to investigate the behavioural determinants of players' intentions towards RMT. Researchers in behavioural economics combine theoretical concepts of economics and cognitive psychology to explain individuals' choices. When choice is driven by hedonic motives, emotions have a primary role in decision-making (Lichtenstein and Slovic 2006). For example, a player's decision to buy a virtual item (e.g., a sword) is motivated by the desire to increase enjoyment in the game. However, this activity may raise rational concerns for its consequences (Hoch and Loewenstein 1991) such as uncertainty about the trustworthiness of the seller. Thaler and Shefrin (1981) proposed the use of a dual-self model in understanding the influences of emotions and rational arguments on an individual's decision process. They posit that an individual's decision is influenced by two selves: a planner and a doer. The planner focuses on long-term utility, using a rational mode of thinking, which underlines the decision's consequences. The doer has a myopic, short-term view, using an impulsive way of thinking affected by emotions such as desire or the need for instant gratification. The nature of the want-should conflict of the dual-self approach has been discussed for centuries, even in Homer's *Odyssey* (Milkman et al. 2008 provide an extensive literature review). We introduce the dual-self model to explore the decision to engage in RMT in a "black market", as it involves both emotional incentives (want) and rational concerns (should).

A player's actual behaviour with respect to RMT cannot be measured in a reliable manner. It is a highly sensitive topic for players as well as subject to a desirability bias (Fisher 1993). The core characteristics of the behaviour (i.e., action outside the boundaries of the game, in a "black market") led us to use a proxy of the behavioural intentions. This variable, similar to the individual attitude, measures the player's judgements of engagement in RMT in different conditions. There has been much research in social psychology on how attitudes predict specific behaviours (e.g., Wilson et al. 2000; Perugini 2005). The links between attitudes, intentions and behaviour have been recently investigated in the domain of digital piracy (e.g., Taylor et al. 2009), yielding a model based on the Model of Goal-directed Behaviour (Perugini and Bagozzi 2001). Taylor et al. provided "an account of how reasons for acting become integrated and transformed into action intentions" (Taylor 2007, 740) and highlighted the importance of attitude towards the act of digital piracy (Taylor et al. 2009). We adopt a similar rationale for using an attitude-based exemplar of decision making, developed to contribute to explaining emotion-influenced behaviours which cannot be explained by the cognitive and deterministic approaches of traditional models (see Taylor 2007 for a thorough argumentation). The following subsections present the behavioural determinants.

### The doer's behavioural determinants of RMT

A player's intention to engage in RMT is influenced by a variety of factors. The behavioural determinants derive from both the doer and the planner aspects of the dual-self. The behavioural determinants of the doer aspect advocate for RMT by highlighting a virtual item's value dimensions as defined by Lehdonvirta (2009): the hedonic, the functional and the social. For example, perceived enjoyment of the game may increase with the possession of a hedonic value item, while the player's wish to increase their social status in the game may be achieved by the possession of a social value item. Online disinhibition is another behavioural determinant of the doer aspect, deemphasising the ethical concerns of RMT. The behavioural determinants from the doer aspect raise a player's instantaneous utility (Milkman et al. 2008) and motivate their engagement in RMT.

A player's idiosyncratic characteristics in the game (e.g., the graphical representation of their avatar's traits like level and class) determine the hedonic value of an item (Lehdonvirta 2009). While armour is useless to a "Thief" because it makes it difficult to move undetected, the same armour is very valuable to a "Knight", who engages in close combat and needs better protection. Other hedonic motives, such as having fun (Guo and Barnes 2007), stimulate the desire to acquire an item. Group play and the importance of maintaining in-game relationships (Cole and Griffiths 2007) may also influence the doer's hedonic motivation to engage in RMT. For example, if an individual enjoys playing with friends, but does not have enough time to spend in progressing at the same rate as they do, purchasing virtual assets could be used to compensate for falling behind (Bartle 2003). Similarly, players who stop playing for a period may return and use RMT to catch up with their friends (Lehdonvirta 2005). In these ways, the

doer aspect motivates the player to increase the perceived enjoyment of the game by acquiring a high hedonic value item. We hypothesise:

> $H^1$: The perceived enjoyment from playing the game has a positive influence on the player's intentions towards RMT.

Competition in the game takes various forms, from obtaining the best sword or armour to becoming the most powerful wizard or slaying the biggest monster. Achievement is a key motivation in MMOG play (Yee 2005a). While not all users play the game for the sake of achievement, it remains a central part of the game experience (Lehdonvirta 2005). A recent study indicates that achievement relates to character competence (Manninen and Kujanpää 2007). Part of this competence consists of a character's items, such as the quality of their weapons and armour, which Guo and Barnes (2007) related to performance expectancy. The doer aspect therefore highlights the player's competitive advantage, which can be increased by the possession of high functional value items (Lehdonvirta 2009). While acquiring powerful weapons and armour through normal game-play is quite laborious, a player can also obtain them through RMT. We hypothesise:

> $H^2$: The perceived importance of competitive advantage in the game has a positive influence on a player's intentions towards RMT.

Virtual worlds are environments for self-expression, communication and social interactions where players form friendships and discuss personal, political and other sensitive issues (Cole and Griffiths 2007). In this context, social status (i.e., being admired by others) may be valued and motivate a player's performance (Bartle 2003). A player's status, most clearly displayed by his level, increases by progressing in the game. Many virtual worlds use a levelling system which requires time and effort to increase. Special weapons and armour, generally very hard to obtain, are items of high social value (Lehdonvirta 2009). The possession of such items can therefore increase a player's status within the community since they are visible to other players (Robischon 2006). The doer aspect highlights the importance of social status and thus the possession of high social value items. We hypothesise:

> $H^3$: The perceived importance of social status has a positive influence on a player's intentions towards RMT.

In virtual worlds, the avatar represents the player. Suler (2004) argues that the lack of physical appearance hinders people from evaluating each other based on the "normal criteria" such as gender, race, or even fashion. In addition, the use of an avatar removes the possibility of reading a player's emotional state or attitude from their face, body language, or tone of voice. This dissociative anonymity (Suler 2004) and invisibility can affect a player's online behaviour. Because fear of social reactions may fade away while online, people can feel less vulnerable when playing a game. Thus, online disinhibition supports the doer's motivation towards RMT by reducing ethical considerations. We hypothesise:

> $H^4$: Online disinhibition has a positive influence on a player's intentions towards RMT.

Having described how the doer's behavioural determinants may advocate for RMT, the next subsection includes the planner aspect.

### The planner's behavioural determinants of RMT

The planner aspect of the dual-self model involves behavioural determinants that highlight long-term consequences for the game experience and rational concerns about violating the game rules. Such concerns include perceived fairness, anticipated regret, the operator's indirect costs, other players' reactions, the unplanned item scarcity, as well as the uncertainty about the seller's behaviour and being caught. Generally speaking, the behavioural determinants of the planner aspect emphasise the future utility rather than the instantaneous utility of an action (Milkman et al. 2008).

Research on perceived fairness shows that people care about being treated and treating others fairly in anonymous transactions, and it has been found that people are willing to punished unfair behaviour (Kahneman et al. 1986). According to Consalvo's study of cheating as a mechanism of gaining advantage in online games, RMT falls "along a spectrum of unfair advantage" (2007, 165). The adverse effects of an unfair advantage in virtual worlds can be illustrated in relation to the "magic circle" which "is a concept in game studies that refers to the artificial context created by the rules of the game, a "frame" that separates the game from the real world" (Lehdonvirta 2005, 2). If a low-level player suddenly appears with an expensive magical sword in the game that is only attainable by players of a high level, other players may wonder about his engagement in RMT. Repeated experiences of suspected cheating may "crack" the magic circle and damage players' immersion in the virtual world (Lehdonvirta 2005; Lin and Sun 2007). The planner's aspect highlights the player's perceptions of fairness and the importance of maintaining the integrity of the virtual world. We hypothesise:

> $H^5$: Perceived fairness has a negative influence on the player's intentions towards RMT.

Regret is a strong negative emotion, commonly examined in behavioural decision making (e.g., Zeelenberg, 1999) and in consumer behaviour research (Das and Kerr 2010). In a virtual world, a player may regret buying a virtual item. Players enter the virtual worlds with friends and family members and all become part of the community of the game. In addition, a third of all characters, and 90% of high-level characters in WoW, are member of a guild, i.e., an association of players in multiplayer games (Ducheneaut et al. 2006). When there are strong ties between players, the planner aspect highlights the anticipated regret associated with RMT, an activity which may be perceived as cheating from righteous friends, or guild members (Harambam et al. 2011). We hypothesise:

> $H^6$: Anticipated regret associated with RMT has a negative influence on the player's intentions towards RMT.

In the virtual worlds, players may perceive that buying virtual assets comes at no cost to the operator (Castronova 2006). However, the operator experiences indirect costs from players quitting the game as a result of their dissatisfaction with RMT (Bartle 2003), as well from the need to invest in measures to protect players from the adverse effects of RMT (Castronova 2006). The planner aspect takes these indirect costs into account. We hypothesise:

> $H^7$: The perceived operator's indirect cost from RMT has a negative influence on a player's intentions towards RMT.

A virtual world's forums include a large number of discussions about RMT, which is generally treated as unacceptable. There are frequent negative posts about gold-farmers and buyers, providing clear indications that many players are against RMT. The importance a player attributes to others' reactions to his actions can be a strong social influence (Guo and Barnes 2007). The planner aspect underlines the potential negative reactions of other players. We hypothesise:

> $H^8$: Anticipated reaction of other people to a player's RMT activities has a negative influence on a player's intentions towards RMT.

In virtual worlds, item scarcity is maintained for equilibrium purposes. Valuable items are only available after the player completes challenging in-game activities. For example, if a game-generated and controlled dragon has a valuable sword, the first player to kill the dragon gets it. No new swords are added before the dragon reappears in the world. The system works well under normal circumstances, but when gold-farmers take over and "camp" at the dragon's lair, it becomes almost impossible for regular players to obtain the valuable sword (Bartle 2003; Dibbell 2007). This distorts the game's economy by creating unplanned item scarcity. Many players are mainly motivated by goal-oriented activities in the game (Yee 2005b), and unplanned item scarcity reduces their opportunities to achieve their goals. According to Bartle (2003), players are annoyed by activities increasing item's scarcity "artificially" and perceive them as "causing monopolisation". The planner aspect highlights the adverse impact of unplanned item scarcity. We hypothesise:

> $H^9$: Unplanned scarcity of an item because of RMT has a negative influence on a player's intentions towards RMT.

RMT can involve considerable uncertainty, often involving a supplier located in a different country than the buyer (Dibbell 2007) and an information asymmetry problem (Guo and Barnes 2007). The seller, who is usually unknown to the buyer, may act opportunistically and defraud the buyer. Virtual worlds have attracted opportunistic sellers (Robischon 2006) because the buyers cannot seek help for the consequences of an action which violates the rules of the game (Dibbell 2007). The planner aspect highlights this risk of RMT for the player. We hypothesise:

> $H^{10}$: The perceived uncertainty of a transaction with a seller has a negative influence on a player's intentions towards RMT.

There is also uncertainty about the consequences of RMT. Transactions of virtual assets in a "black market" are forbidden by the game rules (Castronova 2003), with the consequences of being caught ranging from a warning to permanent suspension of the seller and buyers accounts. According to Guo and Barnes (2007), a player's reaction to this type of uncertainty relates to their trust of the system or institution. The operator faces challenges in maintaining the game's rules while avoiding pushing customers away. Blizzard Entertainment closes the accounts of gold-farmers', temporarily suspends suspicious players' accounts and cancels suspicious in-game transactions. The planner aspect underlines these risks of RMT to the player. We hypothesise:

> $H^{11}$: Perceived uncertainty about the consequences of RMT has a negative influence on a player's intentions towards RMT.

Having described the theoretical insights and the hypotheses, the next section presents the proposed model.

## The proposed model

We propose a model to investigate players' intentions towards RMT (Fig. 1). The determinants discussed above

are grouped into positive and negative influences, deriving from the doer and the planner aspects respectively. We assume that the doer aspect, which involves impulsive and emotional influences, will motivate engagement in RMT, while the planner aspect, which involves rational influences, will advocate against it.

Finally, we expect that previous experience with RMT will influence players' intentions. This is based on the pilot tests' results which underlined the importance of previous experience as well as on theoretical insights from the digital piracy domain (e.g., Taylor et al. 2009 provide comprehensive measures of previous experience). In this study we investigate whether previous experience with RMT has an effect on player's intentions. The final hypothesis is:

> $H^{12}$: The player's previous experience with RMT will influence the intentions to engage in RMT.

Having described the theoretical model, the next section presents the research method.

## Research method

### Survey instrument, design and sampling

A survey of 38 questions was developed to test the hypotheses. It also included questions about demographics and use statistics. The respondents were asked about their perceptions using Likert scales ranging from 1 (totally disagree) to 7 (fully agree). Previous experience with RMT was measured by a categorical variable (i.e., 0=no, 1=yes). The survey instrument was first pre-tested with a group of 15 subjects and was then pilot-tested by recruiting players from fans sites, resulting in 70 usable respondents. Respondents were offered the opportunity to participate in a lottery for an iPod and 10 "Prepaid Game Cards" providing access to WoW for one month, (i.e., 15 Euros).

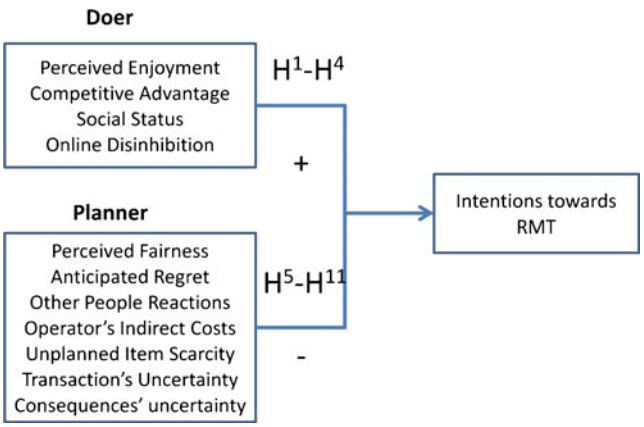


**Fig. 1** The proposed model

The respondents to the public online survey participated in the same lottery as well.

The results of the pilot-tests were explored through descriptive statistics. The findings highlighted some challenges and led to some changes in the final questionnaire, including changes in the measure of behavioural intentions. In particular, we observed that respondents' intentions towards RMT were highly polarised, with the majority of respondents claiming total disagreement and a small percentage claiming full agreement. This observation motivated us to develop three scenarios in which the respondents were to judge a friend's engagement in RMT under different conditions (for details see Table 1). Scenarios have been used extensively in the field of social psychology (Burstin et al. 1980) for exploring the individual's perception of socially- and ethically-sensitive topics (Alexander and Becker 1978; Finch 1987). Moreover, indirect questions of this type can reduce the social desirability bias (Fisher 1993).

The survey link was posted on the official WoW forum, which is visited by players regularly. The official forum is relatively neutral compared to fan sites, which cater to players with specific interests. The resulting sample included 606 respondents who completed the survey. By using the official site we tried to reduce non-response bias and target the "average" player. Additionally, the invitation for the survey clearly stated the anonymity of respondent and the use of data only for scientific research purposes.

Table 1 summarises the items used to operationalise the constructs of the proposed framework and the results of the reliability and validity tests. Previous experience with RMT is not included because it is a categorical variable. Content validity was established through the development of items inspired by research in virtual worlds and MMOGs (see Table 1 for details). RMT is a relatively new phenomenon and hence we had to adapt the constructs' items to the specific context. We used the pre-tests and the pilot-test to validate the constructs and refine them. Since each construct was assessed using multi-item measures, item analysis was performed to validate the scales (Hinkin 1995).

Internal consistency was calculated in order to assess the reliability of all the constructs. The Cronbach's alpha values for all constructs were acceptable, ranging from 0.715 (for consequences' uncertainty) to 0.933 (for intentions to RMT). Convergent validity was evaluated by item-to-total correlation (the correlation of each item to the sum of the remaining items). All the correlations were positive and significant at the 0.001 level. Discriminant validity was tested using principal component factor analysis with varimax rotation performed for each domain of the research model (Hair et al. 2006). It was determined when items for

**Table 1** The proposed model's constructs and items, reliability and validity test results

| Variable (source)/ Items | Crob. Alpha | Con/nt valid. | Discr/nt Valid. |
|---|---|---|---|
| Perceived Enjoyment (Guo and Barnes 2007) | 0.81 | | |
| I enjoy playing with my friends in WoW. | | 0.661 | 0.799 |
| I enjoy socialising with other players in WoW. | | 0.636 | 0.820 |
| I enjoy player versus environomnet (PvE) in WoW. | | 0.554 | 0.698 |
| I enjoy group playing in WoW. | | 0.671 | 0.798 |
| Competitive Advantage (Guo and Barnes 2007) | 0.771 | | |
| Having a powerful character will allow me to play with my friends. | | 0.614 | 0.835 |
| Having a powerful character will increase my competence. | | 0.599 | 0.569 |
| Having a powerful character will increase my power in my guild. | | 0.519 | 0.516 |
| Having better equipment would better enable me to play with my friends. | | 0.560 | 0.789 |
| Anticipated Regret (Bartle 2004; Das and Kerr 2010; Harambam et al. 2011) | 0.848 | | |
| Buying virtual items (such as gold) would make me feel like I cheat my friends. | | 0.729 | 0.569 |
| Buying virtual items (such as gold) would give me a guilty conscience. | | 0.791 | 0.637 |
| I think that I would regret buying virtual items (such as gold). | | 0.639 | 0.536 |
| Social Status (Bartle 2004; Lehdonvirta 2009) | 0.884 | | |
| It is important for me to be admired for my PvP skills. | | 0.646 | 0.773 |
| It is important for me to be admired for being high level character. | | 0.659 | 0.675 |
| It is important for me to be admired for my knowledge of the game. | | 0.643 | 0.710 |
| It is important for me to be admired for being in a good guild. | | 0.648 | 0.690 |
| It is important for me to be admired for having a high PvP honour. | | 0.665 | 0.765 |
| It is important for me to be admired for having good equipment. | | 0.773 | 0.824 |
| I enjoy being admired in WoW. | | 0.680 | 0.745 |
| Perceived Fairness (Lin and Sun 2007; Bartle 2004) | 0.929 | | |
| I think buying virtual items (such as gold) with real money is fair. | | 0.669 | 0.713 |
| I think that buying virtual items (such as gold) with real money hurts the atmosphere in WoW. | | 0.743 | 0.805 |
| Real money trading gives some players an unfair advantage. | | 0.722 | 0.778 |
| I think it is cheating to buy virtual items (such as gold) with real money. | | 0.803 | 0.839 |
| I think that real money trading hurts the game experience for other players. | | 0.876 | 0.891 |
| I think that real money trading hurts the game atmosphere for other players. | | 0.856 | 0.874 |
| I think that real money trading makes the community less friendly. | | 0.736 | 0.757 |
| I think that real money trading makes the game more difficult for other players. | | 0.672 | 0.706 |
| Online disinhibition (Suler 2004) | 0.827 | | |
| I find it easier to start a conversation with strangers in WoW than in the real world. | | 0.511 | 0.656 |
| I talk more about personal issues with online friends than with real world friends. | | 0.517 | 0.599 |
| I feel that being online removes some of my self-restraints. | | 0.634 | 0.727 |
| My online personality is different from my real world personality. | | 0.635 | 0.760 |
| I appreciate that other players cannot see me when I play WoW. | | 0.518 | 0.645 |
| I act differently to other people in WoW than I do in the real world. | | 0.665 | 0.795 |
| Other People Reactions (Guo and Barnes 2007) | 0.852 | | |
| My friends would be angry with me if they found out that I bought virtual items (such as gold) with real money. | | 0.705 | 0.799 |
| My friends would refuse to play with me if they found out that I bought virtual items (such as gold) with real money. | | 0.793 | 0.853 |
| I would be excluded from my guild if they found out that I bought virtual items (such as gold) with real money. | | 0.683 | 0.805 |
| Operator's Indirect Costs (Guo and Barnes 2007) | 0.852 | | |
| I think players stop playing WoW because of real money trading. | | 0.746 | 0.917 |
| It is likely that people who sell virtual items (such as gold) for real money play the game using stolen credit cards. | | 0.746 | 0.907 |
| Seller's Uncertainty (Guo and Barnes 2007) | 0.823 | | |

**Table 1** (continued)

| Variable (source)/ Items | Crob. Alpha | Con/nt valid. | Discr/nt Valid. |
|---|---|---|---|
| I believe that sellers of virtual items (such as gold) will deliver the agreed item. | | 0.787 | 0.883 |
| I believe that sellers of virtual items (such as gold) will deliver on time. | | 0.712 | 0.874 |
| The sellers of virtual items are likely to scam (defraud) the buyer. | | 0.550 | 0.695 |
| Consequences' Uncertainty (Guo and Barnes 2007) | 0.715 | | |
| Having my account suspended would be frightening. | | 0.566 | 0.781 |
| Having my account suspended would be embarrassing. | | 0.524 | 0.711 |
| Reading stories about closed accounts frightens me. | | 0.521 | 0.788 |
| Unplanned Item Scarcity (Bartle 2004) | 0.73 | | |
| I think real money trading makes it more difficult to obtain rare items through normal play. | | 0.577 | 0.604 |
| I think that gold farming causes monopolization. | | 0.577 | 0.512 |
| Intentions towards RMT (developed by the authors) | 0.933 | | |
| One of your friends enjoys playing WoW but does not have a lot of time. To keep up with you he is considering to buy gold by using real money to get a mount[a] like yours. I think buying gold would be acceptable under these circumstances. | | 0.904 | 0.743 |
| One of your friends has been away from WoW for a long time. He would like to play with you and is considering buying gold by using real money to get a mount like yours. I think buying gold would be acceptable under these circumstances. | | 0.901 | 0.739 |
| One of your friends account has been hacked and he has lost all his equipment. To compensate he is considering to buy gold using real money. I think buying gold would be acceptable under these circumstances. | | 0.786 | 0.723 |

[a] Beasts, or other transportation items, used in WoW, for transportation.

each construct loaded onto single factors with a factor loading greater than 0.500.

## Players' intentions towards RMT

Most respondents were males (93%) and the average age was 23. The majority of respondents (70%) were employed and had an average monthly income of 2,100 US dollars. The geographical distribution shows that the largest proportion of respondents lived in the US (19.5%) and the UK (18%), with other locations including Denmark (10%), the Netherlands (9%), Sweden (8%), Germany (5%) and Norway (5%). On average, respondents had played WoW for 31.5 months and for 27 hours per week, indicating an experienced sample. This level of time investment may indicate game dependency; however this does not influence the validity of the results. The absolute majority (96%) had a character of the highest level (e.g., level 85), and on average they had 7.5 characters above level 20. These demographics are similar to other recent studies of online games (e.g., Chen et al. 2010). We tested for effects from the demographic variables of age, gender, country of residence and experience with the game and found no significant effects on intention to engage in RMT.

The players' intentions towards RMT were investigated through a multiple regression analysis ($F_{(12,606)}$ =56.063, $p<0.001$) . Table 2 displays the results.

The positive influences from the doer aspect on intention to engage in RMT involve social status and online disinhibition. Interestingly, perceived enjoyment and competitive advantage were not significant. Thus, we find support for $H^3$ and $H^4$. Moreover, we find support for $H^{12}$, as previous experience with RMT did have an influence on the players' intentions. We further investigated players'

**Table 2** Multiple regression's results for the intention to engage in RMT

| Variables | Coefficient | SE |
|---|---|---|
| Constant | 1.262* | 0.060 |
| Perceived Enjoyment | −0.053 | 0.074 |
| Competitive Advantage | 0.037 | 0.045 |
| Anticipated Regret | −0.205* | 0.041 |
| Social Status | 0.116** | 0.048 |
| Perceived Fairness | −0.555* | 0.052 |
| Online Disinhibition | 0.147* | 0.047 |
| Other People Reactions | −0.016 | 0.038 |
| Operator's Indirect Costs | 0.037 | 0.038 |
| Unplanned Item Scarcity | 0.041 | 0.041 |
| Seller's Uncertainty | −0.183* | 0.047 |
| Consequences' Uncertainty | 0.038 | 0.040 |
| Experience with RMT | 0.265* | 0.049 |
| *R Square* | *0.517* | |

*$p<0.001$

**$p<0.025$

previous experience with RMT and found that only a small percentage of the respondents (16%) claimed that they had engaged in it previously. Those respondents also responded on a Likert Scale from 1 (not at all) to 10 (very much) about their happiness (m=4.38), excitement (m=3.57) and satisfaction (m=4.56) with their last purchase.

The negative influences from the planner aspect in the intentions to engage in RMT were to be found significant for perceived fairness, anticipated regret, and perceived uncertainty about the seller. Other determinants, such as item scarcity, uncertainty about the consequences of RMT, social reactions of other people and the operator's costs, were not significant. Thus, we find support for $H^5$, $H^6$ and $H^{10}$. The findings are discussed in the next section.

## Discussion

The case of the WoW offers an empirical setting to introduce new models and investigate user behaviour in forbidden economic activities such as RMT in a black market. By focusing on different behavioural determinants and integrating the dual-self model, this study presents a new model for investigating users' intentions to engage in these types of activities.

Many IS models, designed to explain and predict user behaviour, focus on technology acceptance as a combination of technology-related perceptions such as performance expectancy, effort expectancy, perceived behavioural control, and trust. Guo and Barnes' framework (2007) is a good example of this research stream analysing psychological determinants based on users' interactions with the technology and the perceived uncertainties, amongst other things. We contest the notion that RMT is a decision mainly influenced by economic considerations and determinants influencing the player's instantaneous and future utility from the game. Instead, we offer an alternative model based on behavioural economics that can complement research of similar phenomena. For example, similar to WoW, both social status and fairness may motivate users to generate content in various Web 2.0 applications (e.g., YouTube and Facebook) where users respond to the content uploaded by other users. This may also be true for blogging activities, where users who comment on a blog may expect the blog owner to comment reciprocally. Finally, online disinhibition may influence the behaviour of users who participate in environments with a different identity (e.g., YouTube). We believe that the proposed model enables researchers to investigate user behaviours observed in current online settings, which may not be fully explained by technology-related perceptions and beliefs about users' technical skills. Web 2.0 applications provide good service performance and are easy to use, but their adoption and use demands time investment from users. Behavioural determinants from the dual-self model may explain users' propensity to invest time in Web 2.0 applications.

There have been a number of studies focusing on economic considerations of information goods' adoption. Network effects and switching costs are prominent in the adoption, or purchase of digital products and online services (Shapiro and Varian 1999). The proposed model may complement this type of research by focusing on the role of individual behavioural determinants. For example, the importance of the user's social status in an online environment may contribute to a specific service or application lock-in and increase switching costs for the user. As the user invests more time and effort to improve his social status, he increases his entrenchment to the specific service or application. Alternatively, the user's perception of fairness may motivate reciprocated behaviour in case of a service enabling user generated content. In turn, this may increase the service usage by the user (e.g., provision of content) and thus further increase value of the service by complementing network effects.

Turning to the practical implications for the operators in the game industry, our findings suggest that new incentive schemes should be developed to deterring players from RMT. Severe punishment is unlikely to work and, because of the high costs involved, it is not recommended. Instead, incentives should build upon the perceived fairness, anticipated regret, or uncertainty about the sellers of virtual items. For example, engaging in RMT may break trust between players and negatively influence their game experience or break the "magic circle". The guilds, to which most players belong, may be the natural defenders of fair play. In this scenario, operators may have a better chance of limiting RMT and deterring the players' involvement by priming the ethical and social costs for the players' community. Operators may develop a strategy based on raising awareness by using online campaigns where users discuss the perceived fairness of RMT. This strategy may change players' behaviour by underlining the costs of "destroying" the group spirit and trust among guild members. Additionally, operators should continue their efforts to track and stop gold-farmers by technical means, while revealing information about the risks involved for players being defrauded. However, operators should also acknowledge the importance of social status as well as the influence of previous experience with RMT in players' intentions. Operators may provide alternative means of improving "social status" in the game and in doing so could fight RMT by offering competing solutions. Overall, we recommend a strategy focusing on the high ethical costs for users engaged in RMT and the underlining the risks of such transactions, along with continued tracking and deterring of gold-farmers.

## Conclusions

New online environments enable users' active participation in platforms and service development. The relatively simple interfaces allow users to interact in different ways and empower them. User behaviour is changing in these environments, with new types of behaviour emerging, expanding the boundaries of legality and ethics. This study is one of the first research attempts to understand users' intentions towards such an activity, namely RMT.

Theoretical insights from behavioural economics were introduced and a new model was developed to investigate players' intentions to engage in RMT. Behavioural determinants related to either instantaneous (i.e., doer aspect) or future utility (i.e., planner aspect) in the game were investigated. Further research is expected to provide insights on the interplay between the doer and planner determinants in the players' intentions towards RMT.

The present research was subject to some limitations. The main challenge was the difficulty encountered in measuring players' behaviour and particularly their actual engagement in RMT. Because of the nature of the study (i.e., a survey advertised in the official discussion forum of the game), some players might reasonably have felt uncomfortable revealing their behavioural intentions. Another challenge was encountered in the sampling process. Since the survey was announced in the main discussion forum of the WoW, the sample included frequent visitors and not people who quit the game and might therefore have had a different attitude toward RMT. Additionally, the survey was offered in English, reducing the target sample to English-speaking players. Finally, we did not investigate cultural influences in the decision to engage in RMT.

Further research in the IS field could consider the use of the proposed model as a research tool for investigating user behaviour towards Web 2.0 applications, social networks and digital piracy. In these online environments, we observe behaviours based on economic, hedonic, and ethical considerations rather than merely users' ability to interact with the underlying technology.

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