Influence of virtual world end-user motives on social capital

PhD Thesis submitted by

Mohamed Nazir Riad Mohamed

For the degree of Doctor of Philosophy

College of Business, Law & Governance

James Cook University

Cairns, Queensland 4870

Australia

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Abstract

This virtual platform study enhances the building of stronger social communities. It researches the influence of end-user motives on social relationship dimensions by highlighting the mediating pathways of social connectivities. Developers and businesses can enlist the findings to customise their virtual end-user-targeted solutions and then deliver value-added virtual services and products.

The relationship between end-user motives and the formation of social capital remains critical in understanding casual influences; however, there has been no previous research looking at this relationship by considering social connectivities. Previous research on end-user motives and social capital within one type of online gaming environment indicated some driving factors behind the development and formation of social capital in virtual worlds.

This study focuses on active end-users participating in one of three substantive virtual world platforms to examine whether end-user motives influence their social capital dimensions.

Three basic theories—gratification, social relationship and social capital—underpin this study's social capital motives model. In this model, end-user motive antecedents—achievement, control, escapism and friendship—are linked to social connectivities through bridging and bonding, which, in turn, are linked to the social capital's cognitive, relational and structural dimensions.

An online global survey in English provided 274 valid and usable cases from three different virtual worlds.

A quantitative approach is used to test the proposed research framework model. The resulting empirically tested social capital motives model was bootstrap-validated using AMOS 22. The model delivered a high-quality fit across all relevant fit indices.

The social capital motives model verified 12 hypothesised paths as significant and theoretically justified. Here, achievement and escapism show a significant positive

effect on bridging social connectivities, whereas control, escapism and friendship show a significant positive effect on bonding social connectivities.

Next, bridging social connectivities shows a strong positive effect on bonding social connectivities. Bridging social connectivities also offers a positive influence on cognitive social capital. Bonding social connectivities positively affects cognitive, relational and structural social capital dimensions. Finally, both the cognitive and structural dimensions are found to have a significant effect on the resulting relational social capital dimension.

The social capital motives model contributes to research within international business (particularly virtual world businesses and social media) and information technology platforms. Theoretically, this study's two-stage Structural Equation Modelling (SEM) path model integrates three theories and redefines bonding and bridging as social connectivities.

This study shows end-user motives can indirectly influence social capital dimensions through social connectivities. Thus, researchers investigating the formulation of social capital in virtual worlds can apply the social capital motives model as a starting point when developing their more advance social capital research models.

Businesses can engage the social capital motives model to further motivate their end-users to generate greater social capital, which, in turn, will strengthen interactions among existing end-users and, consequently, attract new end-users.

List of Acronyms and Abbreviations

2D	2 Dimension
3D	3 Dimension
AGFI	Adjusted Goodness of Fit Index
AMOS	AMOS is statistical software and it stands for analysis of a moment structures
AVE	Average Variance Extracted
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CMC	Computer-Mediated Communications
df	Degree of Freedom
DGW	Dynamic Gaming World
DVW	Dynamic Virtual World
EFA	Exploratory Factor Analysis
EU	Entropia Universe
FB	Facebook
GDP	Gross Domestic Product
GVW	Gaming Virtual World
IFI	Incremental Fit Index
IM	Instant Messaging
IP	Internet Protocol
KMO	Kaiser-Meyer-Olkin
MMORPGs	Massively Multiplayer Online Role-Playing Games
MVW	Mixed Virtual World
NGO	Non-Government Organisation
PED	Project Entropia Dollar
RMSEA	Root Mean Square Error of Approximation
RMT	Real Money Trading
RNI	Relative Non-centrality Index
SEM	Structural Equation Modelling

SL	Second Life
SMN	Social Media Network
SNS	Social Network Sites
SPSS	SPSS Statistics is a software package used for logical batched and non-batched statistical analysis.
SVW	Social Virtual World
TLI	Tucker-Lewis Index
VC	Virtual Community
V-Economy	Virtual Economy
VR	Virtual Reality
VW	Virtual Worlds
WOW	World of Warcraft

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CHAPTER 1

1. INTRODUCTION

Virtual worlds (VWs), virtual communities (VCs) and social networking sites (SNSs) have experienced substantive technological developments and continual growth in end-user engagement across the globe (Chung, Nam, & Koo, 2016; Guo & Gong, 2011). This has altered the boundaries, the limits and the scope of virtual social communications (Chung et al., 2016; Wang, Yeh, Chen & Tsydypov, 2016). VWs, VCs and SNSs each provide different, yet dynamic platforms. Each platform supports different social interactions between their communities of online global end-users and each does so without restrictions of boundaries, borders, time or space (Bell, 2008; Novak, Mladenow, & Strauss, 2014).

VWs can be defined as platforms where end-users can create and customise a personal avatar that can simultaneously explore, communicate and interact with the surrounding virtual environment. Such virtual engagements are in addition to communicating with other end-user avatars (Aichner & Jacob, 2015). VWs represent a dynamic new media channel that facilitates virtual social interactions between virtual participants (avatars) within a virtual community platform.

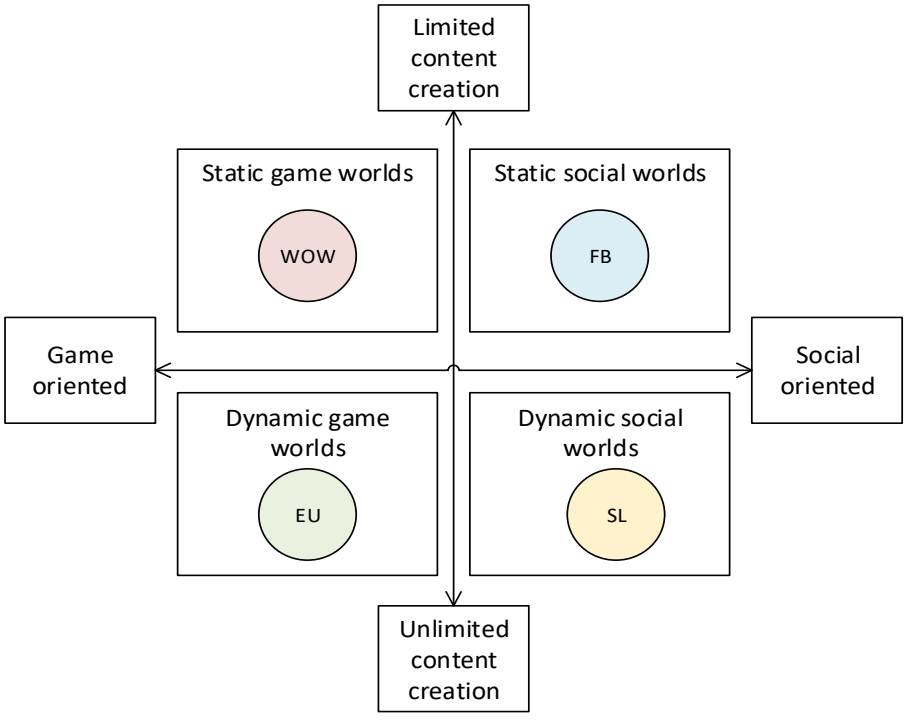


Figure 1.1: VWs platforms incorporated in Henttonen et al. (2009) “categorization of virtual worlds”

Figure 1.1 shows Henttonen et al.'s (2009) classification of VWs based on the dynamic nature of a platform's content and the degree of its gaming to social orientation. This study categorised Facebook as having limited forms of content and a high degree of social orientation. Second Life (SL) fits within the dynamic content and socially oriented quadrant. Entropia Universe (EU) fits within the dynamic content and gaming-oriented quadrant. World of Warcraft (WOW) fits within the fourth quadrant: limited forms of content and gaming-oriented. These are further discussed in Chapter 2.

VWs are becoming a part of some end-users' daily lives—serving to satisfy these participants' desires. These desires can generally be described as entertainment, escapism, social interaction, information sharing, achievement, friendship, personalisation and leisure time (Bartle, 2004; Chung et al., 2016; Ridings & Gefen, 2006; Yee, 2006).

Marketers remain interested in understanding end-users' motivations towards VWs. These new media channels can be crafted by marketers seeking to deliver effective messages to targeted avatars that represent their respective end-user participants (Jin, 2014).

VCs are defined as a group of online users (or their avatar participants) who form an online social network for personal relationships (Kannan, Chang, & Whinston, 2000). VCs can include many forms: (1) blogs, (2) massive multiplayer online role-playing games (MMORPGs) and/or (3) virtual world environments with new realities—such as can be seen in SL.

End-users in VCs likely hold common goals, interests and/or beliefs. They are likely to share information and knowledge, and to become more involved in forms of social interactions (Chiu, Hsu, & Wang, 2006). Each VC then facilitates and sets its resourcing to appropriately support its community of end-user members (Chiu et al., 2006).

Similarly, SNSs are online community platforms where end-users are able to create their own individual profile through their avatar participant and to then connect with other end-users to navigate through the various shared content and available information (Boyd & Ellison, 2007). SNSs continue to increase. They are now more than just socialising sites: SNSs now offer extensive communication channels, and these now

appear in a variety of VW forms (Chang & Zhu, 2012). For example, Facebook users can communicate through, chat, status updates, wall posts, voice and video (Chung et al., 2016) and, more recently, through live video broadcasting (Bolton, 2016). In contrast, Instagram communicates through the sharing of image collections.

As VWs and VCs grow and are further adopted across the globe, the social interactions within each of these platforms become an important contributor towards building the virtual platform's social capital. Some researchers support relationships between VW communities and their delivery of social capital (Blanchard & Horan, 1998; Chow & Chan, 2008; Huvila, Ek, & Widen, 2014; Huvila, Holmberg, Ek, & Widden-Wolfe, 2010; Zhang & Kaufman, 2015). For example, Huvila et al. (2010) and Williams (2006) find online gaming and other online-motivating activities (motives) can increase "bridging social capital", whereas other more engaging activities and motives might have a different influence (such as bonding) on this virtual platform's social capital.

Social capital is often defined against the availability of resources development that can be achieved through a form of social interaction. The general common view is that communities with strong ties between their members possess greater social capital compared with those with weaker ties (Putnam, 2000).

The recent increase in the use of VWs suggests there is likely a need to examine the motives driving participation within such virtual platforms and to then link these end-user motives to the end-users' acquired social capital. The social interaction across virtual platforms then becomes an important aspect of building social capital. The virtual platform can facilitate the delivery of social capital at different levels depending on the end-users' requirements (Huvila et al., 2014; Inkpen & Tsang, 2005; Trepte, Reinecke, & Juechems, 2012).

Trepte et al. (2012), Yoon (2014) and Zhong (2014) defined two levels of social capital: connected through bridging (lower level) and bonding (higher level). Putnam (1995) classified individual-level social capital as bridging (arising through weakly connected community ties) and bonding (arising through strongly connected community ties). Bridging and bonding are near equivalents to differing levels of social values (or consumption) acquisition processes (Hamilton & Tee, 2013). Currently, VWs and VCs

influence the levels of social capital engagements required and both create bridging or bonding connectivities situations for their respective end-user participants.

This study first pre-sections social capital drivers into two levels of connectivities: bridging and/or bonding forms of engagement (Basilisco & Cha, 2015; Huang, 2016; Reer & Krämer, 2014; Sheer & Rice, 2017). We now term, and redefine, bridging and bonding as forms of social connectivities. Social connectivities maps the interactive and/or engagement strengths of a VWs community ties both into and between its end-users.

Secondly, this study follows Lee (2014) and Zhao et al. (2016) and sections the relationship structures that build from social connectivities into three forms of social capital: cognitive, relational and structural.

Considerable research on VW end-users' characteristics and motives does exist (Hassouneh & Brengman, 2014; Hau & Kim, 2011; Iqbal, Kankaanranta, & Neittaanmäki, 2010; Zhao et al., 2016). Similarly, there is considerable research on social capital in VWs (Xiayu Chen et al., 2016; Wang & Chiang, 2009; Yeh, Lin, & Lu, 2011). However, there is little research considering a wider view of different VWs or their different VW types.

Previous studies have investigated either social connectivities (bridging and bonding) (Xiayu Chen et al., 2016; Wang & Chiang, 2009; Yeh et al., 2011) or social capital dimensions (Chen et al., 2015; Hau, Kim, Lee, & Kim, 2012; Jung, Lee, Yoo, & Brynjolfsson, 2011; Zhao et al., 2016), but only as separate studies. Other studies have considered end-users' motives, but have not investigated the effect of their motives on both bridging and bonding social connectivities in different VWs (Basilisco & Cha, 2015; Xiayu Chen et al., 2017; Huang, 2016; Yeh et al., 2011). The end-users' motives to participate in VWs have also been investigated separately (Basilisco & Cha, 2015; Zhou, Jin, Vogel, Fang, & Chen, 2011), but only in single-VW environments.

Thus, there is a lack of empirical understanding of the effect of the individual end-users' motives (concerning their social connectivities). There is also a lack of empirical understanding of the effect of motives for consumptive social connectivities or around how social connectivities then affects the social capital attained as gauged through the gratifying experiences attained by the end-users in these different types of VWs. Thus,

this study seeks to capture these dimensions as they likely offer further understanding regarding the formulation of social capital. This may then be used to strengthen the end-user's attachment to a specific VW.

This study selects the following representative VWs: Second Life (SL) to represent a social VW (SVW), World-of-Warcraft (WOW) to represent a gamified VW (GVW) and Entropia Universe (EU) to represent a mixed VW (MVW). SL is considered one of the most popular SVWs (Bessière, Ellis, & Kellogg, 2009), WOW is considered the most popular GVW (Reer & Krämer, 2014) and EU is considered one of the successful VWs that sits between SVW and GVW in terms of levels of engagement (Bray & Konsynski, 2006). Specifically, this study includes these three types of VWs (social, mixed and gaming) as these provide a spread of end-user motives concerning their level of involvement in their chosen VW (Nazir & Lui, 2014).

Finally, this study seeks to empirically examine the influence of the end-user's motives towards their VW and its social connectivities, and to relate these against this VW's social capital dimensions. This study can then build knowledge related to the above-mentioned research gaps by answering the main research question: **How do end-user motives influence social capital dimensions in a virtual world?** To answer the main research question (RQ), this study will answer the following sub-questions:

RQ1. Are VW end-user motives to participate (and to engage) different in each VW?

RQ2. Do end-user motives influence social connectivities?

RQ3. Are there differences in influence between the three VWs?

RQ4. Does social connectivities differentially influence social capital?

To investigate the above research questions, this study develops a social capital motives model as illustrated in Figure 5.2.

This study is organised as follows. Chapter 2 covers the background and the literature review. Chapter 3 encapsulates the research model and the hypotheses. Chapter 4 delivers the methodology and the results. Chapter 5 provides the discussion and the research implications. Chapter 6 presents the conclusion and future research options.

By answering the research questions, this study theoretically and empirically addresses the research gap. It also provides useful managerial solutions to enable business continuity in VWs using different platforms.

1.1. Organisation of the thesis

This thesis comprises five chapters. Chapter 1 articulates the research motivations and objectives. Chapter 2 describes the theoretical foundations upon which the research is developed. It then presents the research model and articulates a number of empirically testable propositions. Chapter 3 discusses the hypotheses of the research study and the research model. Chapter 4 describes the research methodology. The chapter starts with a brief review of the research design. It then discusses the site selection, the research plan and the data collection procedures. Chapter 5 summarises the results of the research. Chapter 6 examines the contributions of this research, acknowledges its limitations, discusses the implications of the research for theory and practice and offers suggestions for future research.

CHAPTER 2

2. LITERATURE REVIEW

2.1. Overview

This chapter reviews previous literature on end-user motives in VWs, social capital connectivities and social capital dimensions. To build a theoretical framework, end-user motives in VWs, social capital connectivities and social capital dimensions are discussed.

2.2. Background

A VW houses the end-user's virtual 3D animated characters—collectively termed "avatars". Here, the real-world end-user is represented by avatars. Each avatar navigates within the 3D VW under the control of their end-user.

Thus, an avatar—in the context of the VW—is a graphical representation made by the end-user in a three dimensional (3D) form through which that end-user's avatar can interact with the surrounding virtual objects and with other contactable end-user avatars (Liu & Williams, 2008; Nah, Schiller, Mennecke, Siau, & Sattayanuwat, 2011; Tikkanen et al., 2009). Like humans, avatars can exchange instant messages, virtual objects and virtual money. They may also communicate through texting chatting, displaying different gestures, by voice conversations and by actions (Nazir & Lui, 2016).

Henttonen et al. (2009) grouped existing VWs into four categories as outlined in Figure 2.1. These categories are: static game world (game-oriented environment with limited content creation); dynamic game world (game-oriented environment with unlimited content creation); static VWs (social-oriented environment with unlimited content creation); and dynamic VWs (social-oriented environment with unlimited content creation).

Figure 2.1 outlines the three VWs of this study (SL, EU, WOW) within Henttonen et al.'s (2009) classification scale. This scale is based on two main factors: the orientation (either gaming or socialising), and dynamicity (either dynamic or static). This shows that the three VWs of this study offer clear differences within the VW domain. Numbering from 0 to 10 represents the strength of each factor on the scale, where 10 means very strong, 1 means very weak and 0 means no effect.

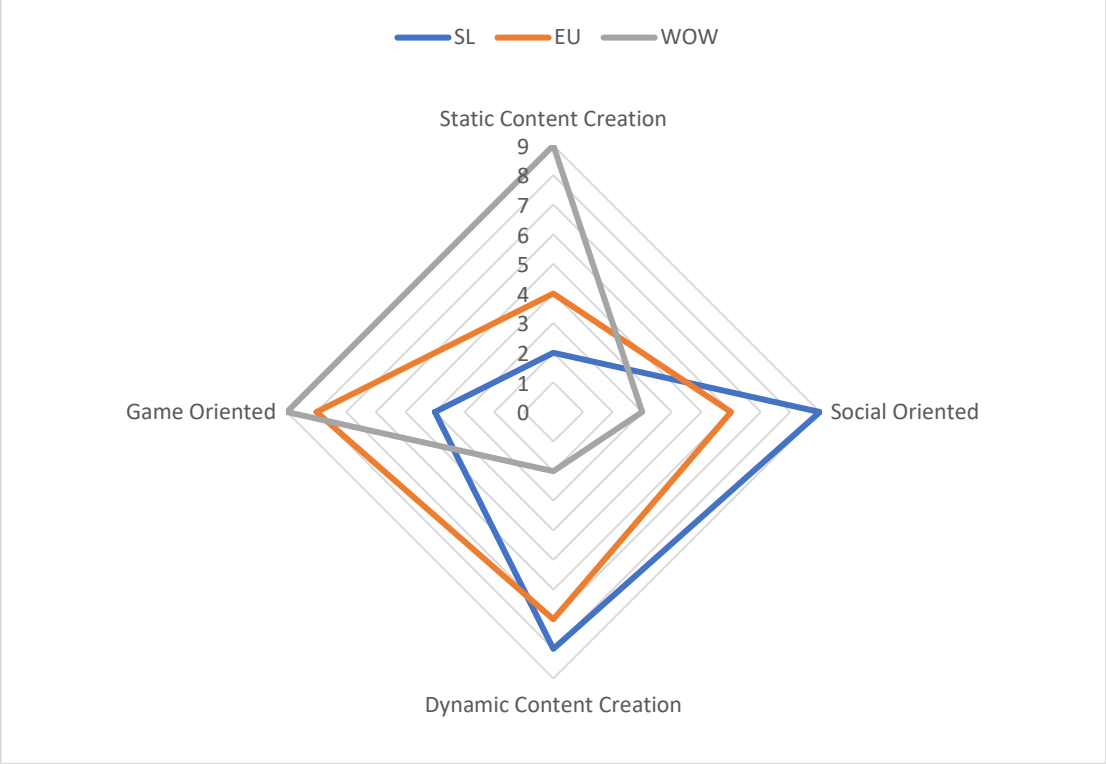


Figure 2.1: VW classifications (developed from Henttonen et al., 2009, p. 1362)

To further refine the differences between these three VWs, this research focuses on the dynamic game world (DGW) and the dynamic VW (DVW) because these categories (Figure 2.1) offer a high level of flexibility, interactivity and integration, and are suitable platforms when considering real money trading (RMT) research. There is no tangible limitation (other than any technological limitation) in the VW; accordingly, software developers can convert anything imaginable into a form of virtual reality (Tikkanen et al., 2009).

2.2.1. Different virtual worlds

Jung (2011) classified VWs into social VWs (SVWs), mixed VWs (MVWs) and gaming VWs (GVWs). SL, as the representative SVW does contain some gaming activities, but these are developed by the end-user and not by the developers of SL. At the other extreme, EU as an MVW, is a dynamic gaming world that also includes very high-level social activities and collaboration. In 2013, EU listed a moon for development, with management rights bidding starting at US$150,000. The winner is now allowed to operate their own moon in EU (Entropia Universe, 2013; McGlaun, 2013). There are different and extensive differences between social-related and game-related activities

in these different VWs. There are also different features available for creating dynamic content and interactions with other end-users.

WOW, as the representative GVW, allows end-users to just explore the landscape, fight monsters and complete quests (Calvert, 2010). The virtual currency used in WOW is gold. In the past, exchanging gold with real money happened illegally, outside the control of Blizzard Entertainment (the WOW game developer).

SL allows end-users (as avatars) to meet, interact and create individual or group activities in a manner similar to the way activities are conducted in real life, such as going to the cinema, shopping in retail malls, engaging in sport stadium activities and/or participating in education (school or university). In SL, resident avatars can create their own virtual property, provide services and products and allow for the purchase of services or items. Here, some international brands, such as DELL, Sony Ericsson, IBM and Mazda, also operate through their own virtual properties (Zhang & Shrestha, 2010).

SL residents earn Linden Dollars by working in a SL virtual job or by investing in real estate or by directly exchanging real money for Linden Dollars (using the LindeX exchange market). Virtual currency is then used to purchase different VW items such as clothes and fashion, virtual property, virtual vehicles and pets.

From 2003 to 2013, the number of VW end-users in SL grew from a virtual land size of 64 acres to 448,000 acres and expanded to more than 36 million residents. In 2014, there were over 1 million active end-users in SL, with over 1.2 million transactions each day for virtual items (Hendaoui, Limayem, & Thompson, 2008; Linden Lab, 2013).

Similarly, VWs such as WOW and EU also experienced significant growth in terms of both the number of end-users and the size of their respective economies (Gapper, 2006; Nazir & Lui, 2016).

In 2004, Blizzard Entertainment launched WOW. WOW allows end-users to just explore landscapes, fight monsters and complete quests (Calvert, 2010). WOW is one of the largest massive multiplayer online virtual games (Takahashi, 2014). Since its introduction, WOW has seen considerable growth around the world, including in the United States, Canada, Europe, Australia, South America and Asia. In WOW, each

player's character has a specific set of skills and abilities that defines that character's role. The virtual currency used in WOW is gold. In April 2015, a new token trading system was introduced by Blizzard for its WOW virtual worlds (BBC News, 2015).

The exchange rate for US$20 climbed to more than 30,000 gold coins at the launch of the new system, but fell sharply within hours to 22,000 gold coins. A new token trading system is now available for North American WOW players only (BBC News, 2015). In WOW, players can exchange gold for valuable resources and for items in WOW such as weapons and armour. Essentially, the core gameplay of WOW revolves around fighting monsters and completing quests to attain more gold.

EU is a gaming dynamic virtual world that combines both the traditional dynamic game virtual world—such as WOW—and the dynamic social virtual worlds such as SL. Its MindArk developers community described it as a *"3D Virtual Environment for Online Entertainment, Social Networking and E-commerce using a real cash economy"* (MindArk, 2008). Participants control their custom-built avatars and can participate in various activities such as hunting alien creatures, resource mining, visiting space stations and crafting tools, clothes, armour and weapons (Falk & Bosson, 2009). VW end-users can also practice virtual economic activities within EU including trading weapons and skills in this virtual world.

The marketplace of digital media for both virtual products and services is large and complex (Dharmawirya, Morales-Arroyo, & Sharma, 2008). This virtual marketplace generates a lot of opportunities for end-users due to the aggregation and distribution space of this new virtual market (Dharmawirya et al., 2008; Morales-Arroyo & Sharma, 2009).

The economics of EU apply to virtual planets and they have substantial real financial outcomes. Virtual property sales on some of these virtual planets have realised world record prices. In 2010, the gross domestic product (GDP) of EU was around US$428 million. In 2014, the Planet Arkadia became the EU's first million dollar virtual property (PR Newswire, 2014).

Azeharie and Sharma suggested in their 2010 study that individuals might be motivated to consume virtual products and services for the psychological experience of narrowing the gap between the virtual and real worlds.

Project Entropia Dollars (PEDs) is the virtual currency of EU. Players can earn PEDs by performing different activities, such as collecting virtual fruits and stones in the game, or by selling skills that can be obtained in the game to other players (PR Newswire, 2014). A PED has a fixed exchange rate of 10 PEDs for US$1. There is a range of methods for earning PEDs in EU, such as hunting and selling valuable items, or selling mined or acquired resources (Meredith, Hussain, & Griffiths, 2009; Nazir & Lui, 2016).

VWs provide innovative platforms that end-users (avatars) can inhabit to interact with objects created within the environment. Through their avatar, the end-user communicates and socialises with avatars of other end-users. With this socially interactive VW community in place and well established, many companies now look at VW domains as new platforms for exploring, experimenting and expanding their physical business (Liu & Williams, 2008).

The new virtual platform involves a high level of added value, which is much more than those in the traditional real world (Dharmawirya et al., 2008; Morales-Arroyo & Sharma, 2009): *"As such, producers, consumers, syndicators, aggregators and distributors have to be relentless in seeking out opportunities and being dynamic in their business relationships"* (Dharmawirya et al., 2008).

Some companies believe VWs offer new business markets and can support the physical business brands that exist in real life (Cagnina & Poian, 2007; Liu & Williams, 2008). Currently, different kinds of businesses use VWs for various activities including (but not limited to) selling both virtual and real products (Liu & Williams, 2008). The majority of these companies, however, are focused on marketing, brand promotion and product development, plus the selling of both real and virtual products and properties (Liu & Williams, 2008).

2.2.2. Gaming virtual worlds

GVW platforms encourage team players and group formation, where groups combine their strengths to quickly complete the same quest to win mutual benefits. These special interest groups work together as guilds to generate a competitive high profile within these VW social capital-friendly environments, and they mirror real life social groups (Zhang & Kaufman, 2015). They require member engagement, commitment and dedication. Guild players in GVWs fulfil roles in their group such as killers, irritants and preservers. Guild success arises where the group balances the fulfilment of these three member roles (Zhang & Kaufman, 2015).

Strong relationships of trust are often developed in such competitive group environments (Zhang & Kaufman, 2015). Here, trust relationships and social capital are based on their members' actions, their attributes and on their networks of affiliation (Dickey, 2007).

2.2.3. Social virtual worlds

In contrast to competitive gaming of GVWs, SVWs are designed to replicate real-life experience, thus allowing different types of interaction between end-users along with extended and unrestricted experiences. Here, end-user avatars can craft, buy and sell products and services; they can dance, drive, eat, marry and so forth. Hence, they can live an entire virtual life (Mäntymäki & Salo, 2013; Zhou, Jin, Vogel, Fang & Chen, 2011).

Hassouneh and Brengman's (2014) motives for joining SVWs include making friends, to escape reality, to be a role player, to achieve (by developing a revenue-generating business), to seek relationships and/or to manipulate others. These fit within Sharma, Qiang, Wenjun and Qi's, (2013) model of the VWs end-users' motives as four constructs: technology, social networking, entertainment and revenue-making.

Both SVWs and GVWs support innovative and trusting social interactions (Malaby, 2006; Zhang & Kaufman, 2015). These kinds of interactions have attracted the interest of researchers attempting to understand the nature of social capital as it is organically developed in massively multiplayer online role-playing games (MMORPGs) (Chang & Chuang, 2011; Xiayu Chen, Huang & Davison, 2016; Pearson, Carr & Shaw, 2008).

2.2.4. Social relationship as a generator of social capital

Several empirical studies have attempted to explain the relationship between VWs and social capital. It is widely agreed that playing MMORPGs leads to strong social relations between the members (Huvila et al., 2010; Zhang & Kaufman, 2015; Zhong, 2011). In this study, we term this social relationship "social connectivities". Previous studies focused either on one VW platform or on a specific country, such as Zhong's study on Chinese online games in 2011, or towards a specific VW, such as Huvila et al.'s (2010) study that targeted only SL. In addition, research papers seldom compare different VWs against different groups or categories (such as SVWs, MVWs and GVWs) (Huvila et al., 2010, 2014; Reer & Krämer, 2014; Zhang & Kaufman, 2015).

In model developments, both SVWs and GVWs support innovative and trusting social interactions (Malaby, 2006; Zhang & Kaufman, 2015).

2.2.5. Social capital

There is limited research comparing end-users' motives, purchasing behaviour, purchasing intention and personal preferences across VW types (Chambers, 2011; Drachen, Riley, Baskin, & Klabjan, 2014; Hau & Kim, 2011; Y. Jung & Pawlowski, 2015). This study considers this area by using qualitative data from three most popular VW types (SVW, MVW and GVW). This study is among the first to link motives with social connectivities through to the delivery of end-user social capital. This gap/issue is approached based on a review of the extant literature across VWs, v-communities and online communities.

Recent years have witnessed a rapid increase in the use of social media networks for different purposes, including business. This rapid increase in the popularity of social media has attracted researchers towards studying social media networks (SMNs).

2.2.6. Social media networks (SMNs)

SMNs are platforms where end-users can communicate, interact and share information with each other. Such platforms are internet-based applications—built on the ideological and technological foundation of Web 2.0 (Kaplan & Haenlein, 2010). SMNs are not limited to social networks as are Facebook and Twitter. They also include

forums, blogs, business networks, social gaming, end-user communities and virtual worlds (Kaplan & Haenlein, 2010; Smith, Smith, & Shaw, 2017).

Virtual world platforms used in some SMNs provide either 2D or 3D platform environments where end-users are represented by customisable avatars. Here, the end-user (as an avatar) engages, interacts and communicates with the avatars of other end-users. They execute end-user-directed actions within their specific (and surrounding) VW environment (Aichner & Jacob, 2015).

2.2.7. Virtual to real money trading

Different virtual worlds have their own virtual currencies, which they use inside the virtual world. These in-game real money trades allow the purchase and sale of virtual items or structures. The virtual currency within these games has an actual real money trading (RMT) value (Aichner & Jacob, 2015).

2.2.8. Social media engagement motives

Several studies have investigated the motives behind the rapid increase of social media websites. Most of these studies focus on Facebook, with many of these studies employing “uses and gratification theory” to address end-user motives towards joining a social media channel. This theory suggests that the main end-user motive is to fulfil their existing needs, which, in turn, drives end-user actions (Papacharissi & Rubin, 2000).

2.3. Gratification (end-user motives) theory

Uses and gratifications theory (Katz & Blumler, 1974) is a general theory investigating the way different media help resolve everyday problems. This theory is widely implemented by gaming platforms and VWs in the communications domain (Przybylski, Rigby & Ryan, 2010).

Uses and gratifications theory is considered one of the most effective theories in media research (Roy, 2009). The theory investigates individuals’ motives, choices and the way end-user use the same media for different purposes and reasons (Basilisco & Cha, 2015). Uses and gratifications theory describes the motives behind an individual

selecting a specific media or platform and the level of satisfaction the individual gains by participating in such a media platform (Joinson, 2008).

2.3.1. End-user motives

Motive is a fundamental aspect of what affects end-user activity and is connected to gratifications theory, which has had a fundamental impact on the study of individual action (Basilisco & Cha, 2015). This theory has been applied in different research studies that investigated media content across a variety of media types, including dominant or emerging new media channels such as social media, SNS, mobile phones and the internet (Basilisco & Cha, 2015; Grant & O'Donohoe, 2007; Rubin, 2009; Ruggiero, 2000).

Previous studies have found different motives involving different media platforms. Roy (2009) found that the main reasons end-users choose to use Facebook and Myspace in the US were to "meet friends" and to "seek information" through Facebook and Myspace connections. As argued by Hassouneh and Brengman (2014) and Lehdonvirta (2009), the majority of researchers either look at social media networks or VWs in general, without considering the differences between VWs.

For example, Hassouneh and Brengman (2014) described motives for joining SVWs as to make friends, to escape reality, to be a role player, to achieve (for example, to create a revenue-generating business), to seek relationships and/or to manipulate others. These constructs also fit within Sharma et al.'s (2013) model of the VW end-user's motives (technology, social networking, entertainment and making-revenue).

In addition, current publications addressing end-user motives in VWs often focus on legal and philosophical issues associated with purchasing behaviour, functionalities and/or hedonic and social attributes. Such previous studies have not considered different types of VWs (Hassouneh & Brengman, 2014; Lehdonvirta, 2009).

Yee (2006) studied GVWs and found that the motives to join were similar to those in SVWs. Yee (2006) argued that "achievement", "social" and "immersion" are the overarching constructs that motivate end-users to join a GVW.

Lin, Hung, Fang and Tu's (2015) study concluded that end-users of VWs are motivated by achievement values to seek personal success. They also found that end-users with achievement values tend to have stronger social position and authority compared with other end-users. *"The six achievement values, which include advancement of wealth and status, victory, socialization ability, self-actualization, fantasy satisfaction, and adventure drive players to successfully meet social standards in MMORPGs"* (Lin et al., 2015, p. 846).

Yee's (2006) achievement construct covers the topics of advancement (the desire to gain power), mechanics (analyse the underlying rules and system in order to optimise personal performance and skills) and competition (the desire to compete with others). The social construct covers the topics of socialising (helping and chatting with others), relationships (forming long-term meaningful relationships) and teamwork, which delivers satisfaction by working in groups. The immersion construct covers the topics of discovery (willingness to find new things), role-playing (creating an improvised story when interacting with others) and escapism (escaping from real-life problems).

Shelton (2010) formed a preliminary taxonomy for end-user motives to participate in the SVW of SL. The study used a web-based survey and formed independent constructs as end-user motives for using SL and gauged frequency of purchasing different products with demographic characteristics. Shelton concluded that SL end-users had different motives, for example:

- End-users with higher identity motives had a significantly higher frequency of purchasing apparel and appearance products than end-users with low identity motives.
- End-users with higher social/entertainment motives purchase more entertainment and home furniture than end-users with low social and entertainment motives.
- End-users with higher achievement motives purchase more business products than end-users with low achievement motives.

Previous research sought to understand end-user profiles and characteristics in virtual worlds (Jung & Pawlowski, 2014a; Ridings & Gefen, 2004; Spence, 2008). For example,

Ridings and Gefen (2004) suggested the main goals for participating in the virtual communities is for: (1) information exchange, (2) entertainment, (3) socialising (social relations) and (4) psychological support.

End-users' access to SVWs can also be motivated by similar end-user goals as found in GVWs and other virtual worlds. Virtual worlds offer a platform where end-user participants communicate, create interpersonal relationships and build new networks (Jung & Kang, 2010).

Bartle (2004) classified end-user motives to participate in GVWs as explorers, achievers, socialisers and controllers. Explorers are interested in discovering new places and environments. Achievers are seeking to achieve a goal or wealth. Socialisers attempt to socialise with others by forming teams and groups to share interests and ideas. Controllers are looking for competition, challenge and gaming. For competitive auto racing, (Hamilton & Tee, 2015; Hamilton, Tee, & Prideaux, 2015) classified race track attendees (end-users) somewhat similarly as adventurers, gratifiers, socialisers, values, actors or inquirers.

Yee (2006) classified end-users of GVWs based on Bartle's schema (2004), but added new motive-based goals: (1) immersion, (2) socialising and (3) achievement (Yee, 2006). Each motive has the sub-motives: immersion (customisations, role-playing, escapism and discovery), socialising (relationships and teamwork) and achievement (advancement, competition and mechanics). Huvila et al. (2010) categorised SL end-users into two broad groupings—producer and non-producer—however, as these studies focused only on the end-user's activities in SL, this classification includes the creation of virtual properties, items and objects.

As expected, producers in SL are more active than non-producers on all constructs except sightseeing, where the difference is marginal. Producers actively participate in formal meetings, build things, meet new people, shop, own and develop property, sell things they create and participate in voluntary/charity work (Huvila et al., 2010).

SL producers also search for inspiration, engage as a pass-time activity and find that SL adds something to their life—sometimes presenting opportunities to do business and to earn money (Huvila et al., 2010). Bartle (2004) and Yee (2006) studied GVW platforms

whilst Ridings and Gefen (2004) studied dynamic SVWs and GVWs. Most other studies based their research on a marketing perspective.

End-user motives can be grouped as follows: achievement, advancement, autonomy, challenge (*competition*), collaboration (*teamwork*), communication, control, convenience (*ease-of-use*), customisation (*choice*), enjoyment (*amusement, arousal, pleasure*), entertainment, escapism, exploring (*discovery*), fantasy (*novelty*), financial (*money*), friendship, functional, habit, identity, immersion, individualism, information exchange (*information seeking and information sharing*), love (*real-life partner, true-love*), mechanics, playfulness, relationship, role play, self-efficacy, self-expression, socialising and usefulness.

This research study looks at the motives that encourage end-users to keep participating in the VW. This study considers the target audience to be actual end-users of a VW. These end-users choose to continue to participate (or play); thus, they show less concern about its usefulness or ease-of-use. This study, therefore, does not include usefulness and ease-of-use as motives for participating in the VW because existing end-users are familiar with the VW platform and they are able to use it and navigate within it.

This study does not include entertainment as a motive for the actual participant end-users of a VW platform. For example, if the end-user motive is to achieve something (such as making money), and/or to be in control (personalising items), and/or to make new friends and/or to escape beyond real-life situations; then, this can lead to a feeling of entertainment or contentment, e.g. satisfaction, trust or loyalty. These are post-motive measures (Hamilton & Tee, 2015). Thus, entertainment is a broad concept. It can be considered as a motive, as something being achieved or as an outcome from an experience. Thus, it remains difficult to classify and, therefore, is not included in this study.

Table 2.1: Cross-Comparison of Studies on End-Users' Motives

	Achievement								Control				Ease of use			Entertainment				Escapism				Relationship (friendship)				Useful
Reference	Achievement	Mechanics	Challenge	Financial	Role play	Self-efficacy	Self-expression	Advancement	Customisation	Control	Financial	Identity	Advancement	Convenience	Ease of Use	Habit	Entertainment	Exploring	Enjoyment	Playfulness	Autonomy	Fantasy	Escapism	Immersion	Individualism	Socialising	Collaboration	Relationship	Information	Communication	Friendship	Usefulness
(Basilisco & Cha, 2015)														✓			✓									✓			✓		✓	
(Hassouneh & Brengman, 2014)	✓				✓																		✓					✓			✓	
(Zhong, 2014)			✓														✓					✓	✓									
(Verhagen, Feldberg, van den Hooff, Meents, & Merikivi, 2012)											✓				✓				✓				✓									
(Barnes, 2011)																✓			✓													✓
(Barnes & Pressey, 2011)																			✓						✓							
(Partala, 2011)							✓											✓	✓			✓				✓						
(Yeh et al., 2011)															✓				✓							✓						✓
(Zhou et al., 2011)											✓							✓								✓						
(C.-W. Lee, 2010)	✓				✓															✓												
(Y. Jung & Kang, 2010)											✓							✓	✓				✓			✓			✓			
(Shelton, 2010)	✓											✓					✓									✓						
(Hua & Haughton, 2009)										✓					✓											✓						✓
(Merikivi, 2009)																			✓	✓						✓						
(Shen & Eder, 2009)						✓													✓	✓												✓
(Fetscherin & Lattemann, 2008)																											✓	✓				
(Williams, Yee, & Caplan, 2008)	✓																							✓		✓						
(Dickey, 2007)	✓		✓							✓																	✓					
(Ryan et al., 2006)										✓											✓											
(Yee, 2006)	✓	✓			✓				✓				✓					✓						✓		✓		✓	✓			

In this study, we use four main motive constructs (achievement, control, escapism and friendship). In developing the motives constraint of this study, we first investigate previous research models that apply end-user motives to participate in online communities. From this approach, we elucidate seven main motives to participate and then narrow this to four online community motives (achievement, control, escapism and friendship) that relate to the three virtual worlds (SVW, MVW, GVW) of this study.

Next, these four online motive constructs can be individually distinguished across the different VWs of this study. For example, the need to achieve a goal, or a purpose, may be different in each different VW as each environment has a specific intention from the end-user's perspective. Creating relationships and friendship is a motive and the reason for creating these friendships can be different in each VW. Escapism is a second motive why end-users participate in their chosen VW. Here, end-users engage in a VW fantasy that keeps them away from their real life, both emotionally and mentally.

Control is a power that many end-users look to acquire. It allows these end-users to control, personalise and customise their characters, characteristics and surrounding environments.

2.4. Social connectivities

Economic capital is measurable as the net wealth acquired by a person. Human capital can be measured by the values (skills, knowledge and techniques) a person is acquiring. End-user capital is also measurable through the socialising structures of relationships among end-users. Bourdieu (1980), Nahapiet & Ghoshal (1998) suggest end-user social capital consists of two measurable constructs: (1) the social relationships developed with other end-users and the resources consumed, and (2) the quality (and amount) of the resources available (Huvila et al., 2010). Bourdieu's (1980) study views social capital as either weak (bridging) or strong (bonding). In this study, we term these relationships (bridging and bonding) as social connectivities.

2.4.1. Social relationship theory

By nature, humans are social beings. One key feature of humans is their sociality and social relationships involved in all aspects of human life and in the most extensive,

complex and diverse ways (Fiske, 2010). These kinds of social relationships take place at the point where two or more people interact with each other (Fiske, 2010). Therefore, social relationship theory suggests that relationships are supported by the norms of behaviour that in turn provide a roadmap to evaluate relationship partner/s (Aggarwal, 2004) .

Fiske (2010) identified four basic models that include different features of sociality. These four models came to be known as the relational models theory and comprise:

- **Communal sharing:** this model happens when people within the community relationship reflect and consider themselves as equivalent within the social domain.
- **Authority ranking:** in this model of relationship, people are assumed to be on different levels (unequal), where subordinates reflect, obey and respect, and where supervisors reflect and give orders and also offer care and protection.
- **Equality matching:** in this model of relationship, people aim to reflect and achieve a balance across participants and to achieve a reflective point where participants take turns, and there is an equally shared distribution: one person, one vote.
- **Market pricing:** this kind of relationship is a reflection relationship where socially meaningful ratios (or rates, namely, salaries, rents, interests, etc.) are accepted. It does not necessarily involve money.

These different relationship models are used to reflect and coordinate, construct and contest social actions that occur during human interactions, whether physically or digitally (for example, via social media, social network sites or new media) (Batta & Iwokwagh, 2015; Fiske, 2010).

Social relationship theory is closely related to knowledge sharing. Based on Jiang, Ma, Shang and Chau's study (2014), the theory of social relationship looks at socialisation as a form of knowledge sharing. Participants in the group are drawn to reflect and possibly understand each other more. They then communicate freely and feel more involved within this community and they share knowledge. *"knowledge sharing creates value, investigating knowledge sharing in a virtual community from the economic perspective*

is a fitting attempt to explain the drive of knowledge sharing in social commerce" (Jiang et al., 2014, p. 252).

There are also other theories that affect social relationships, such as "attachment theory". Attachment theory investigates dynamic long-term relationships. This has been widely used for initial understanding of human behaviour (Hong, Zhang, & Walton, 2014). *"Attachment theory identifies different personality orientations that are manifested in individuals' internal working models and conceptualized in terms of anxiety and avoidance"* (Hong et al., 2014, p. 127).

Social capital (relationship theory) is usually associated with Putnam's (1995) definition and explanation of this term. Putnam (1995, 2000) distinguished between two different ways of generating social capital: through bridging or through bonding. Here, bonding forms strong ties, whereas bridging forms weak ties (Putnam, 1995, 2000). Recently, the concept of social capital associated with VWs has received attention; however, research in this area remains limited (Reer & Krämer, 2014). A simple definition of social capital is the benefits (both informative and emotional support) end-users obtain from their participation in their VW social network (Reer & Krämer, 2014; Williams et al., 2006).

2.4.2. Social connectivities: bridging and bonding

Although social capital is normally considered a positive term, it also has negative connotations. Hence, researchers classify social connectivities into two types: bridging and bonding. These, in turn, deliver social capital (Coffé & Geys, 2007).

Bonding is the strong social tie that develops within the specific VW community. Bonding ties often refer to families, relatives, close friends and frequent contacts that can act as a team that can work together as an ongoing support to the community. Bonding ties arise as a result of sharing the same interests, self-disclosure, exchange information and support (Haythornthwaite, 2002). Bonding is considered to be building towards "*a binding social capital",* which can result from developing emotional and/or instrumental support towards other members within this community (Zhong, 2014).

Bridging is considered a weaker tie within the VW community. It often refers to the grouping of end-users with diverse backgrounds, values and vision. These less-focused end-users may display broader social horizons and, thus, can have widely divergent reasons for integration (and adaption) within such less-connected communities (Williams, 2006). Thus, bridging connectivities results where a heterogeneous network group is sharing and possibly building some positive form of end-user-relevant externalities (Coffé & Geys, 2007; Williams, 2006).

Coffe and Geys (2007) and Marschall and Stolle (2004) have espoused that bridging connectivities has less of a chance of building positive social capital externalities than bonding connectivities due to the collective diversity of end-users. Huvila et al. (2010) argued that a VW positively influences online bonding connectivities and the generation of social capital, whereas Williams et al. (2006) argued a more pessimistic view.

2.4.3. Previous social connectivities studies

The rapid developments in innovations and new technologies give end-users the ability to work together, yet socialise from a distance through electronic interactions. Virtual teams can be in different global locations, yet they can still work collaboratively through their online interactions and communications (Alqithami & Hexmoor, 2012). Huvila et al.'s (2010) research showed that SL is a completely social environment and that it both generates and contributes to the social capital of its end-user participants. Huvila et al. (2010) found that a key reason for participating in the SL is for socialising with other end-user participants. Thus, SL and other similar VWs are similar in this regard and suitable platforms to develop strong virtual communities; thus, they also have the capability to support strong end-user social connectivities. The constructs of measuring social capital in both SL and real life are each based on reflective end-user considerations such as trust, acceptance-of-culture, diversity and reciprocity (Huvila et al., 2010; Williams, 2006).

However, in the real world, societies in the USA have experienced a decline in their traditional social capital (Putnam, 1993). This has been partially offset by a revolutionary rise in the social capital generated within cyber networks. Huvila et al. (2010) noted that traditional real-life communities and their social bonds have been

broken and partially replaced by the emergence of globally networked societies (Bourdieu, 1980; Huvila et al., 2010).

Huvila et al. (2010) moved social capital studies into VWs and found SL to be an environment where social capital positively changed, with producers committing to their community, committing to their social engagements and committing to executing interactions. This, in turn, builds social capital and also suggests that different types of end-users can display different levels of social connectivities (and, thereby, different levels of social capital) in a VW. This suggests that comparing SL end-users can deliver further understanding of the VW environment and its engagement processes. This is likely a key factor towards the success of information sharing, which, in turn, has a significant direct effect on the level of social capital reflected and, consequently, impinges on the functioning and effectiveness of information sharing (Huvila et al., 2010).

Thus, SL, EU and WOW appear to be encouraging environments for social capital studies. Social capital as a research area has been investigated through social connectivities (bridging and bonding) (Coffé & Geys, 2007; Reer & Krämer, 2014; Yoon, 2014; Zhong, 2014). Table 2.2 summarises the studies that look at social connectivities alone, without linking them through into social capital reflections.

Table 2.2: Grouping Social Connectivities Studies

Reference	**Bonding**	**Bridging**	**Linked to Social Capital Dimensions**
(Huang, 2016)	✓	✓	
(Sheer & Rice, 2017)	✓	✓	Only relational social capital
(Reer & Krämer, 2014)	✓	✓	
(Yoon, 2014)	✓	✓	
(Zhong, 2014)	✓	✓	
(Trepte et al., 2012)	✓	✓	
(Zhong, 2011)	✓	✓	
(Coffé & Geys, 2007)	✓	✓	
(Williams, 2006)	✓	✓	

The constructs of social capital (cognitive, relational, structural) (Carey, Lawson, & Krause, 2011; Chua, Lim, Soh, & Sia, 2012; Inkpen & Tsang, 2005; Tsai & Ghoshal, 1998) individually house sub-constructs such as trust, norms, networks, shared values and shared language. Table 2.3 summarises social capital constructs and sub-constructs.

2.4.4. Social connectivities constructs deployed in this study

Previous studies looked at two levels of social connectivities: bridging and bonding (Coffé & Geys, 2007; Huang, 2016; Reer & Krämer, 2014; Sheer & Rice, 2017; Zhong, 2011). As Table 2.2 demonstrates, both bridging and bonding are widely examined connectivities constructs. Thus, this study investigates both bridging and bonding social connectivities as key contributors towards the generation of social capital.

2.5. Social capital theory

Social capital theory provides a theoretical prospective to gauge the benefits obtained by communities, organisation or groups through their social networks (Carey et al., 2011). Social capital theory helps identify the community relationships. It focuses on the use of information resources to identify differences in performance within and between individuals participating in the community/group (Koka & Prescott, 2002).

Social capital theory has been widely described as a collection of resources integrated in the social relationships (Coleman, 1988) and value creation (Nahapiet & Ghoshal, 1998). Nahapiet and Ghoshal (1998, p. 243) defined social capital as *"the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit"*.

2.5.1. Social capital

Social capital provides different reflections and benefits to the society and community. These can be mapped using social capital component constructs. These constructs provide glimpses of how social environments can further support knowledge development and the achievement of further end-user professional goals. These component constructs of social capital include shared value, trust, identity, culture value, ties, networks, norms and roles (Alqithami & Hexmoor, 2012; Blanchard & Horan, 1998; Huvila et al., 2010; Nahapiet & Ghoshal, 1998).

Social capital is summarised by Alqithami and Hexmoor (2012, p. 682) as *"Better together, Get involved, Build trust, Connect with others"*. Alqithami and Hexmoor (2012) described social capital as the collaborative effort between end-users (actors and/or individuals) and the organising of these participants into social networks that can

continue to conduct collective activities and achieve specific (and often different) purposes including investments, marketing, designing and/or building environmental components.

The common element between social capital and VWs is that end-user participants in both environments share recognised common interests and often through high levels of interaction and communication. For example, an SL end-user is typically involved in the platform as both a means of seeking to socialise with others and also to discover new worlds (Jung & Kang, 2010; Mennecke, Mcneill, Ganis, & Townsend, 2008).

Alternatively, an EU end-user mixes their socially oriented platform with their gaming oriented platform and, thereby, builds a new mixed platform. In this situation, some social activities are recognised as actually helping the EU end-user to develop better gaming skills (Falk & Bosson, 2009; Kieger, 2010).

The gaming platform WOW places its end-user gamers into groups that can operate and support the overall gaming experience both inside and outside the WOW platform. Here, each game character holds unique avatar attributes that encourage each end-user player to reflect and then form collaborative groups. These then work together and combine their different avatar functionalities to achieve a net common quest and win mutual benefits for the group (Dickey, 2007; Zhang & Kaufman, 2015).

A typical WOW group requires each end-user gamer to kill, irritate and/or preserve components for the group. A comprehensive group carefully reflects and balances all three roles. They typically co-operate and reflectively collaborate, which increases the group's chances of success (Zhang & Kaufman, 2015).

The acquisition of social capital concept is the same across all VW types. However, the goals, purpose and intentions for building greater social capital can differ according to the type of VW platform engaged. Further, the way social capital is developed and the reasons behind social capital formulation also differ for end-users across differing VW platform types. Huvila et al. (2010) has supported this view and also suggested that SL and other similar VWs offer both encouraging and suitable environments for strengthening the end-user's social capital.

2.5.2. Previous social capital dimensions studies

Three social capital dimensions have been suggested in previous studies (Chen et al., 2016; Lin, 2011; Nahapiet & Ghoshal, 1998; Wang, Yeh, Chen, & Tsydypov, 2016): cognitive (shared language, shared vision, shared values, etc.), relational (trust, obligation, norms, etc.) and structural (network ties, etc.) (Chen et al., 2016; Lin, 2011; Nahapiet & Ghoshal, 1998; Wang et al., 2016).

Onyx and Bullen (2000) studied local communities in New South Wales, Australia, through six social capital constructs under the themes “participation in networks”, “reciprocity”, “trust”, “social norms”, “the commons” and “proactivity” (Law & Chang, 2008).

Hau and Kang (2016), Striukova and Rayna (2008) and Wagner et al. (2014) used “trust” for relational social capital and “ties” for structural social capital. In cognitive social capital, Hau and Kang (2016) used “shared goals”; however, Striukova and Rayna (2008) used “shared values” and Wagner, Beimborn and Weitzel (2014) used “shared language”.

Table 2.3 summarises relevant studies that focused on social capital constructs and on their social capital components. As studies covered in the literature can be framed under three social capital constructs (cognitive, relational and structural) these are used as this study’s first-level social capital constructs. Table 2.3 also indicates shared language (cognitive), trust (relational) and network ties (structural) as widely applied social capital constructs.

This research involved cognitive, relational and structural constructs to measure social capital, which is supported by previous studies (Chen et al., 2016; Hau et al., 2012; Nahapiet & Ghoshal, 1998; Wang et al., 2016). These and other researchers have shown that social capital has cognitive, relational and structural components that can enable the community to achieve common goals and also gain personal benefits (Nahapiet & Ghoshal, 1998).

2.5.3. Online social capital

Virtual worlds and social capital share a lot of common principals such as collaboration between participants in building groups and small communities that allow them to interact and build group trust. Several collaborations take place across online platforms; for example, a not-for-profit organisation called “Debra of America” ran a campaign in SL and successfully raised community awareness about the disease Epidermolysis Bullosa (Second Life, 2014).

Huvila et al. (2010) showed that end-users with no connection between their social capital in real life and VW social life can (if they reflect and choose) build real-life friends from the resident end-user networks they establish in SL. Here, the greater their end-user engagements in producing SL solutions the greater the social capital they generate. In SL, trust is derived through social behaviours, rather than through specific indicators such as type of account or appearance (Huvila et al., 2010). Therefore, to investigate VW trust-building, it is important to investigate the kinds of social behaviours occurring between end-users within the different kinds of VWs.

Identifying the dimensions of social capital in VWs can help establish measurement constructs (processing, strengths being acquired, values that build into social capital) that track the involvement differences between end-user types within different VWs. This approach can also identify which of these social capital dimensions are more effective in the different VWs.

Comparing end-user types and target groups can also expose VWs’ differences and assist in understanding the values that contribute towards improving their social capital. Hence, this study considers such measurement constructs when investigating social capital across different VWs.

These are reflective or after-the-event considerations and research on social capital is summarised in Table 2.3 under three key constructs: cognitive, structural and relational social capital.

Table 2.3: Grouping Social Capital Studies

Social Capital Constructs	Cognitive								Relational					Structural	
Social Capital Components / Social Capital Studies	Perceived similarity	Shared belief	Shared culture	Social engagement	Shared goals	Shared language	Shared practice	Shared value	Shared vision	Identification	Norms	Obligation	Reciprocity	Trust	Network configuration	Ties / social interaction
(Lefebvre, Sorenson, Henchion, & Gellynck, 2016)						✓			✓					✓		✓
(T. Wang et al., 2016)						✓								✓		✓
(Xiayu Chen et al., 2017)						✓								✓		✓
(Zhao et al., 2016)	✓													✓		✓
(Y.-C. Chen et al., 2015)								✓						✓		✓
(S. Lee, 2014)											✓			✓		
(Hau et al., 2013)					✓									✓		✓
(Nov, Ye, & Kumar, 2012)							✓							✓		✓
(Carey et al., 2011)										✓		✓		✓		✓
(Hau & Kim, 2011)					✓									✓		✓
(H. H. Chang & Chuang, 2011)						✓				✓			✓	✓		✓
(C. P. Lin, 2011)						✓				✓	✓	✓		✓	✓	✓
(Lu & Yang, 2011)						✓			✓				✓	✓		✓
(van den Hooff & de Winter, 2011)						✓					✓	✓		✓		✓
(J.-C. Wang & Chiang, 2009)		✓		✓					✓	✓			✓	✓	✓	✓
(Chow & Chan, 2008)					✓									✓	✓	
(Pearson et al., 2008)						✓			✓	✓	✓	✓		✓		✓
(Striukova & Rayna, 2008)								✓						✓		✓
(Chiu et al., 2006)						✓			✓	✓			✓	✓		✓
(Inkpen & Tsang, 2005)			✓		✓									✓		✓
(Tsai & Ghoshal, 1998)									✓					✓		✓

2.5.4. Cognitive social capital measures

Analysis of the data in Table 2.3 shows that cognitive social capital captures the end-user's reflective considerations. These include:

Shared belief, defined as a combination of shared representation, interpretation and understanding among members of the virtual community (Wang & Chiang, 2009).

Shared culture, where individuals with the same cultural values and attitude considerations can collectively create solid social capital. Individuals who reflect (to understand) on the cultural values of a new prospective partner can consider the

building of a trust relationship, which can then lead to further cooperation (Alqithami & Hexmoor, 2012; Striukova & Rayna, 2008).

Cultural compromise arises when different cultural values are shared and considered within the group. The adopting of cultural compromise can then add to the performance of many virtual teams, delivering a more productive and effective VW environment (Alqithami & Hexmoor, 2012; Striukova & Rayna, 2008).

Many end-users with similar considered values come together in chosen VWs to create a group in order to share, communicate and interact. This can be based on common cultural values that they then share among themselves (Alqithami & Hexmoor, 2012).

Shared culture refers to the level of behavioural interaction between members in the virtual community (Inkpen & Tsang, 2005). Even though shared culture is important to build strong social capital ties within the community, partnering firms usually have distracted (or different) individual cultural perspectives. In this case, strategic alliances are often formed between firms based on the idea of cultural compromise among the partners concerned (Inkpen & Tsang, 2005).

Shared goals is defined as the common considered understanding that can help achieve community tasks, outcomes and goals (Inkpen & Tsang, 2005). To achieve shared goals, prospective end-users investigating a VC and its members need to see a level of shared culture and shared vision (Inkpen & Tsang, 2005) and then make a decision. Shared goals, vision, culture, belief and practice are highly related and interdependent.

Shared Language serves as a foundation for people to consider and communicate in order to enhance mutual success (Nahapiet & Ghoshal, 1998). The cognitive social capital construct mainly focuses on considered shared interest. Here, researchers apply different terms to describe end-users' shared interests (shared visions, shared goals, shared values, shared beliefs and shared culture). The common foundation of all of these elements is "shared language", which is the most commonly used term to present a cognitive social capital construct (Chiu et al., 2006; Lefebvre et al., 2016; van den Hooff & de Winter, 2011) The term "shared language" means a commonly understood set of terms used within the community that can reflect:

- Shared beliefs (end-users with shared beliefs use terms that are mutually understood);
- Shared values (end-users with shared values use common terms as a reflection of these values);
- Shared goals (end-users with shared goals use common terms that reflect their commitment to achieve common goals).

These shared terms reside under the term “shared language”.

Shared practice refers to communities with shared goals, vision and culture and who often have shared practices. Communities with shared practices have their end-user members reflecting and knowing how to collaborate with each other. Members also communicate and coordinate with each other. Communities with shared practices usually work together to solve problems of interest and, thereby, can enhance the forming of strong interpersonal ties within their VC (Wasko & Faraj, 2005).

Shared value is defined as sharing the same roles, policies and regulations. These values assist in the future improvement of the competitiveness of a community, company or group. They focus on considering, identifying and expanding the connections between social and economic progress. This shared values policy is also found inside social capital groups (Alqithami & Hexmoor, 2012; Blanchard & Horan, 1998; Law & Chang, 2008).

Another example of social capital groups is non-governmental organisations (NGOs), which play an assistance and/or information role in the community. NGOs perform a reflective or considered function outside government. For example, NGOs can assist needy persons to improve living conditions and/or shared resources, and this social capital contribution can help build a community’s sustainable economic profit or deliver other community benefits (Alqithami & Hexmoor, 2012).

In VWs, one of the main reasons for building groups is to create common shared value. These common values are the basis upon which the VW groups are built. Breaking any of the community’s values or rules can possibly result in the offending end-user being removed from the group.

Shared vision refers to a situation in which VC members share goals, concerns and perceptions (Lefebvre et al., 2016). In such environments, end-user members share similar perceptions in order to interact with each other. This kind of interaction is based on collective goals and aspirations. Shared vision in a community helps avoid misunderstanding within the community and assists in the correct communications between members (Tsai & Ghoshal, 1998).

Thus, cognitive social capital may be captured via seven key measures as discussed above. However, in this study, Chen, Zhou and Wan (2016) and Wang et al. (2016), only used shared language to represent cognitive social capital. Further, Table 3 shows shared language is the most widely used construct—it is a broad term, which, in other studies, encompasses shared vision, values, goals and practices (Wang et al., 2016).

Shared language helps the community understand common goals and helps members reflect and behave properly within their communities (Tsai & Ghoshal, 1998). Shared language provides a common reflective understanding through the development of common/shared paradigms, values, stories and terms (Nahapiet & Ghoshal, 1998).

Thus, cognitive social capital uses shared language to measure and assess the level of common terms, language and the understanding acquired by the end-users within the community (Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998).

2.5.5. Relational social capital measures

The relational social capital measures listed in Table 2.3 are summarised as follows.

Identification is defined by Dholakia, Bagozzi and Pearo (2004) as the willingness of the VC end-user to maintain a relationship with other VC members. Identification, in this case, is considered an important component for knowledge sharing (Chang & Chuang, 2011). Identification is also the process in which end-users look at themselves as a part of collective group (Pearson et al., 2008).

Norms, like cultural values, obey similar procedures and rules, and they represent shared values. Norms make it easier to control and monitor individual behaviour under specific standards, which can lead to more productive behaviour in terms of social capital. These kinds of norms can assist in making the community more homogeneous

and can be seen as the foundation for social capital and team building (Alqithami & Hexmoor, 2012; Striukova & Rayna, 2008)

Individual behaviour is always critical in the VW. There are always expectations from the end-users to behave in a specific manner, which can vary from one group to another. Breaking the expected standards of behaviour can lead to end-users being banned from participating in the group or even in the virtual world platform.

Obligation shows an association with both norms of reciprocity and identification. In general, this relational social capital dimension has items that are related to each other and several social capital components can be integrated together (Xiangru Chen et al., 2016; Coleman, 1988) VC engagement involves mutual obligation and responsibility, which can assist in educating other members of the VC community by reducing their incentives for opportunism and malfeasance (Zhong, 2014).

Reciprocity arises from three main elements (norms of collaboration, cooperation, the willingness to exchange knowledge, information and resources) (Mathwick, Wiertz, & Ruyter, 2008). Reciprocity always involves end-users' considered individual commitment to help and support others—and at some assessed personal cost. It is also involved with the expectation that the end-user's commitment and effort to help others is to be repaid sometime in the future (Mathwick et al., 2008; Onyx & Bullen, 2000).

Trust in the social capital context means a willingness to take a risk in the social context. It is based on an expectation of an act that is mutually supportive by other end-users. Trust is a reflection and a consideration built over time and it is an important outcome for both social technologies and for end-user motives. It is considered harder to gain trust in an online environment (and in virtual worlds) than it is in a face-to-face real-life environment (Blanchard & Horan, 1998; Law & Chang, 2008).

Trust is a factor affecting knowledge accumulation and its creation. Trust plays a positive role in building social network cooperation, and it remains important when considering online SVWs. A high level of trust is a component of social capital that can result in improving cooperation and in building stronger future ties between individual or groups of end-users (Blanchard & Horan, 1998; Huvila et al., 2010).

Trust in VWs is a reflective consideration and takes time to develop (Nazir & Man Lui, 2017). It results from an assessment process, but once it is generated it can become stronger. Communities are built in VWs in the expectation of developing trust among their end-users. Trust in a VC develops when the end-users become involved with their group's different activities and see the fulfilment of their social expectations.

Trust has been articulated as an essential element of a community relationship (Anderson & Narus, 1990; Rousseau, Sitkin, Burt, & Camerer, 1998) where *"the kind of personal relationships people have developed with each other through a history of interaction"* (Nahapiet & Ghoshal, 1998, p. 1035).

Relational social capital is used to measure the level of trust and confidence between end-users within the community (Moorman, Deshpande, & Zaltman, 1993; Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998). Table 2.3 shows trust is almost universally used in VW studies. Few other relational social capital measures have been trialled and most have not been repeated. Therefore, similar to Chen et al. (2016) and Wang et al. (2016), trust is a proxy for the relational social capital construct. This is summarised in Table 2.3

2.5.6. Structural social capital measures

The structural social capital measures displayed in Table 2.3 are summarised as follows.

Network configuration is simply the configuring of community network ties in ways that help develop intellectual capital (Nahapiet & Ghoshal, 1998). These community ties provide channels for information transmission; however, the network configuration of these ties is of most value when managing it to support the development of social capital (Nahapiet & Ghoshal, 1998). Network configuration influences both flexibility and ease of information exchange between a network of end-user members in their VC (Chung et al., 2016).

Ties (network ties) remain important in the creation of positive social capital. Strong community network ties support stronger group access to information and opportunities and, in turn, assist in collecting, identifying and allocating scarce resources. This, in turn, can help build some competitive advantage. The strength of the ties between end-user members is an indicator of the success of such a community.

Communities displaying strong ties are shown to successfully build stronger social capital compared with communities with weaker ties (Lin, 1999; Striukova & Rayna, 2008; Hau & Kim, 2011).

Thus, strong ties are contributors towards building strong social capital. This is demonstrated when a group of VW end-users reflects and identifies their collective need to achieve a specific goal. They then choose to allocate a scarce resource and might collaborate to find an acceptable solution to their situation. In the case of EU, for example (and previously mentioned), a group of EU end-user participants wanted to have their own moon, so they self-funded and invested their US$150,000 to develop a moon (PR Newswire, 2014).

Social capital ties (or network ties) express the social influences of the end-users' responses towards exchanging information in their VW community in order to benefit each other. This suggests an end-user community is motivated to collaborate and to achieve a common set of goals for their group (Coleman, 1988).

The structural social capital construct is used to measure the strength of the relationship between end-users within the community (Chiu et al., 2006; Nahapiet & Ghoshal, 1998). In this study, structural social capital is measured using "network ties" (Chen et al., 2016; Wang et al., 2016). Network ties include network characteristics such as social interaction ties, tie strength and centrality (Chiu et al., 2006; Nahapiet & Ghoshal, 1998; Wasko & Faraj, 2005).

2.5.7. Social capital construct items adapted for this study

This research investigates cognitive, relational and structural capital as constucts to measure social capital inherent in social networks.

Cognitive dimension

The cognitive dimension in social capital will be measured through **"shared language"** (Xiayu Chen et al., 2016; Wang et al., 2016).

As identify in table 2.3., shared language can help community members to understand their common goals and behave properly within their community (Tsai & Ghoshal, 1998), as shared language provides a common understanding by developing

common/shared paradigms, values, stories and terms (Nahapiet & Ghoshal, 1998). Cognitive capital is used to measure the level of common terms, language and understanding of the end-users within the community (Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998).

Relational dimension

The relational dimension in social capital will be measured through **"trust"** (Xiayu Chen et al., 2016; Wang et al., 2016).

As identify in table 2.3., trust has been articulated as an essential element of relationship (Anderson & Narus, 1990; Rousseau et al., 1998). Nahapiet and Ghoshal (1998) referred to the relational dimension as *"the kind of personal relationships people have developed with each other through a history of interaction"* (Nahapiet & Ghoshal, 1998, p. 1035).

Relational capital is used to measure the level of trust and confidence between end-users within the community (Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998).

Structural dimension

The structural dimension in social capital will be measured using **"network ties"** (Xiayu Chen et al., 2017; T. Wang et al., 2016).

As identify in table 2.3., network ties is the essential factor for structural capital, which includes network characteristics such as social interaction ties, tie strength and centrality (Chiu et al., 2006; Nahapiet & Ghoshal, 1998; Wasko & Faraj, 2005).

The structural dimension is used to measure the strength of the relationship between end-users within the community (Chiu et al., 2006; Nahapiet & Ghoshal, 1998). Thus, this study offers a proposed nine-construct research model (Figure 2.2).

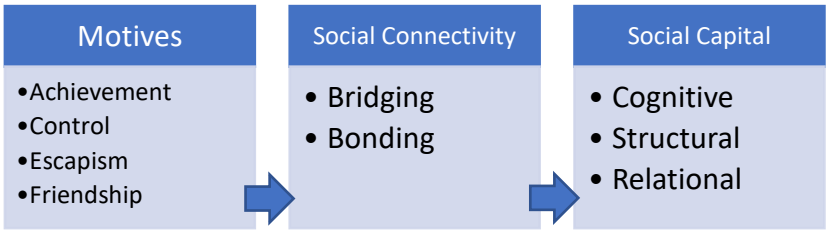


Figure 2.2: Proposed nine constructs for the research model

2.6. Chapter Summary

This chapter discussed the previous studies on end-user motives and social capital in VWs. It looked at the findings of previous literature and, based on these findings, it developed constructs on which to base the research model. Using the developed constructs, a research model and hypothesis will be developed in Chapter 3.

CHAPTER 3

3. HYPOTHESES AND RESEARCH MODEL

3.1. Overview

This chapter presents the hypotheses based on the research question and theoretical review. Building on the suggested theoretical framework, the hypotheses will be developed using the proposed model. Based on the established hypotheses, the final research model is presented.

3.2. End-user motives

3.2.1. Achievement, bridging connectivities and bonding connectivities

Stolle and Rochon (1998) presented labour unions as an example of internally homogeneous groups, with a specific purpose and goals that they would like to achieve (bridging connectivities). In addition, these communities can be political parties that are inspired to achieve certain goals or aims (Stolle & Rochon, 1998). Labour unions and similar unions create communities in order to achieve pre-set goals. Unions and communities created through collaboration between participants with common goals and objectives can have strong ties, such as families, or weak ties such as colleagues at work or within an industry.

Along with Stolle and Rochon's (1998) finding, Yoon (2014) concluded that community participants require a high level of interdependency among members to achieve their goals and increase their bonding connectivities. The previous findings are supported by Zhong (2011) who summarised his finding by saying that collaboration, shared gaming experience and shared goals (including shared gaming achievement motive) created in the online community communications are the basis for creating newly established strong ties in MMORPGs (Yoon, 2014; Zhong, 2011). In summary, being active in the collective play platforms and engaging in successful cooperation should enhance social capital.

Given the above reasoning, we posit the following hypotheses:

H1. Achievement motives positively influence bonding connectivities.

H2. Achievement motives positively influence bridging connectivities.

3.2.2. Control, bridging connectivities and bonding connectivities

Studies in the area of control as a motive in the virtual communities (Coffé & Geys, 2007; Zhong, 2011) have found that these kinds of virtual communities, which are associated with collective play and provide a high level of personalisation and customisation. This kind of personalisation can be an individual or a group motive.

Participants in virtual and social networks can formulate a personalised group that can suit participants' control. These kinds of social interactions and teamwork are beneficial for gamers' social capital (Zhong, 2011). The study adds that the more participants of the collective that play games the more their social capital should be improved.

In the case of having virtual communities where participants can personalise their surroundings, platform and character, this can lead to higher levels of both bonding and bridging social capital and, thus, a feeling of comfort and willingness to share personal stories with gaming friends (Zhang & Kaufman, 2015; Zhou et al., 2011).

Therefore, the following hypotheses are developed:

H3. Personalisation motives positively influence bonding connectivities.

H4. Personalisation motives positively influence bridging connectivities.

3.2.3. Escapism, bridging connectivities and bonding connectivities

Escapism, as a motive, is related to different factors such as escaping real life to a different virtual life and escaping real family and friends by seeking to meet new people in virtual communities in order to feel more confident. In general, it is just replacing the existing situation with a virtual one, which can help improve the well-being of the participants (Yoon, 2014).

In line with the previous explanation (Zhong, 2011), being voluntarily involved in a social network improves communication skills and stimulates a self-efficiency that can provide a high level of confidence, which can positively affect bridging social capital. This is supported by Zhong (2014) who found that seeking to meet new and different people in virtual communities or virtual networks is positively related to online social capital, both bonding and bridging (Yoon, 2014).

From this, we can postulate that people with a high escapism motive would experience a high level of bonding and bridging social capital.

Therefore, the following hypotheses are posited:

H5. Escapism motives positively influence bonding connectivities.

H6. Escapism motives positively influence bridging connectivities.

3.2.4. Friendship, bridging connectivities and bonding connectivities

Trepte et al. (2012) identified three elements related to friendship: physical proximity (which is the level of real-life encounters community members have between each other), operational social proximity (which is the level of involvement in the community) and assessed familiarity (which is community members' training frequency).

Previous studies (Trepte et al., 2012; Zhong, 2014) of friendship-seeking in virtual communities and its effect on maintaining strong or weak ties have found that seeking friendship has a significant relationship to both bridging and bonding social capital. This is aligned with Wellman et al. (1996) who found that a minimum social interaction between members in the community as friends may be sufficient to maintain strong ties (bridging connectivities) between members who know each other well.

Making new friends and maintaining current friendships on social network sites (SNSs) has a strong effect on both bonding and bridging, especially if these kinds of friendships are associated with enjoyment of relationships (Zhang & Kaufman, 2015; Zhong, 2014).

Thus, these studies show supporting evidence for the hypothesis that higher levels of friendship relate to higher levels of bridging and bonding social capital. Therefore, the following hypotheses are posited:

H7. Friendship motives positively influence bonding connectivities.

H8. Friendship motives positively influence bridging connectivities.

3.3. Social capital levels

3.3.1. Bridging connectivities and bonding connectivities

Previous research (e.g. Haythornthwaite, 2002; Zhong, 2011) indicated that establishing a virtual community platform to serve as a base for communication can support participants with weak ties to build stronger relationships and ties. It is logical that the ties in any community start with weak ties at the beginning, and the closeness, effort, trust and support provided by these platforms can help in developing stronger ties.

Zhong (2011) suggested that weak ties generated online and in the virtual platforms move from just online communities to other virtual communities in which participants can share more information together and, hence, exposes gamers to a broad range of other end-users' views.

In line with the research findings of Haythornthwaite (2002) and Zhong (2011), we hypothesise that:

H9. Bridging connectivities positively influences bonding connectivities.

3.3.2. Bridging connectivities, bonding connectivities and cognitive capital

Cognitive social capital, represented by shared language, means more than just a language. Shared language means having common terms that represent shared understanding, aims and points of view, which enables the development of a language that all share and understand.

A substantial body of evidence shows that when participants have different socioeconomic characteristics (e.g. language, race, ethnicity and so on), this influences attitudes towards bonding and might also affect bridging in the other dimension (Coffé & Geys, 2007). This is also supported by Haythornthwaite (2002). This research mentions that evolution can be expected over time as bonding connectivities communities usually develop shared norms. Norms in this context means shared values, terms and language.

This is supported by Wellman et al. (1996) who mentioned that internet users' feelings of closeness are based on having a shared interest. Shared interest usually leads to the

development of shared terms and language. Therefore, it is plausible to assume the following:

H10. Bonding connectivities positively influences attitudes towards cognitive capital.

H13. Bridging connectivities positively influences attitudes towards cognitive capital.

3.3.3. Bridging connectivities, bonding connectivities and relational capital

The findings of Haythornthwaite (2002) show that weak ties, which represent bridging, have a negative relationship with trust as weak ties can quickly dissolve due to reliance on passive and opportunistic benefits more than loyalty and trust.

Strong ties, on the other hand, represent bonding and develop many roles, and as a result, the community and information sharing are more robust and trusted (Haythornthwaite, 2002). These findings contradict Marschall and Stolle (2004) who found that both neighbourhood racial heterogeneity and neighbourhood sociability positively increase the trust level within the community. In order words, both formal and informal social interaction take place in racially diverse communities and this has a positive significant affect in generalising trust (Marschall & Stolle, 2004).

Thus, in line with the above, we suggest:

H11. Bonding connectivities positively influences relational capital.

H14. Bridging connectivities positively influences relational capital.

3.3.4. Bridging connectivities and structural capital

Bridging connectivities, represented by network ties, is an important dimension of social capital in VW communities and promotes crosscutting social networks (Coffé & Geys, 2007). As conceptualised by Haythornthwaite (2002), with further ties, participants can adopt new communication media to support stronger network ties within their community, whereas communities with weak ties can have a lower chance of communicating or influencing each other's behaviour. This finding is supported by Hampton (2003) that the computer-mediated communications (CMC) at the neighbourhood level is formulated by weak ties and community involvement.

In summary, this leads us to assume that:

H12. Bonding connectivities positively influences structural capital.

H15. Bridging connectivities positively influences structural capital.

3.4. Social capital dimensions

3.4.1. Cognitive capital and relational capital

Early empirical studies on social capital (Carey et al., 2011; Tsai & Ghoshal, 1998; Wang et al., 2016; Westerlund & Svahn, 2008) provide evidence that cognitive social capital, which represents shared language, strongly contributes to relational social capital.

Shared language was found to have a critical influence on information exchange, cooperation and trust in virtual community cultures and values (Lu & Yang, 2011). During the process of community interactions, participants recognise and adopt the virtual community's common language, beliefs, codes and vision (Lefebvre et al., 2016; Lu & Yang, 2011).

Nahapiet and Ghoshal (1998), for example, stated that shared language between buyers and sellers build a stronger trust relationship between them as buyers believe that sellers will be honest with them and the same can apply to the virtual communities inside the virtual world: trust can be built through the development of a shared language. These findings corroborate those of Wang et al. (2016) that shared language positively influences trust and also support the results from Lu and Yang (2011), which also found that cognitive capital has a significant positive effect on relational capital. Therefore, the following hypothesis was developed:

H16. Cognitive capital positively influences relational capital in the virtual world.

3.4.2. Structural capital and relational capital

The structural dimension of social capital, operationalised as social interaction ties, is argued to stimulate relational capital (manifested as trust) (Carey et al., 2011). Social interaction ties work as a channel of information sharing, which operate to motivate and strengthen the relational aspect of the social capital and to develop a common viewpoint (Wang et al., 2016).

Few social capital studies (Lefebvre et al., 2016; Lu & Yang, 2011) have found no significant relationship between social interaction and trust. However, the majority of previous social capital research studies (Carey et al., 2011; Meredith et al., 2009; Tsai & Ghoshal, 1998; Wang et al., 2016; Westerlund & Svahn, 2008) agreed that the structural dimension of social capital strongly contributes to relational capital. The greater the social ties strength the higher the trust between participants in the virtual community. Therefore, the following hypothesis was developed:

H17. Structural capital positively influences relational capital in the virtual world.

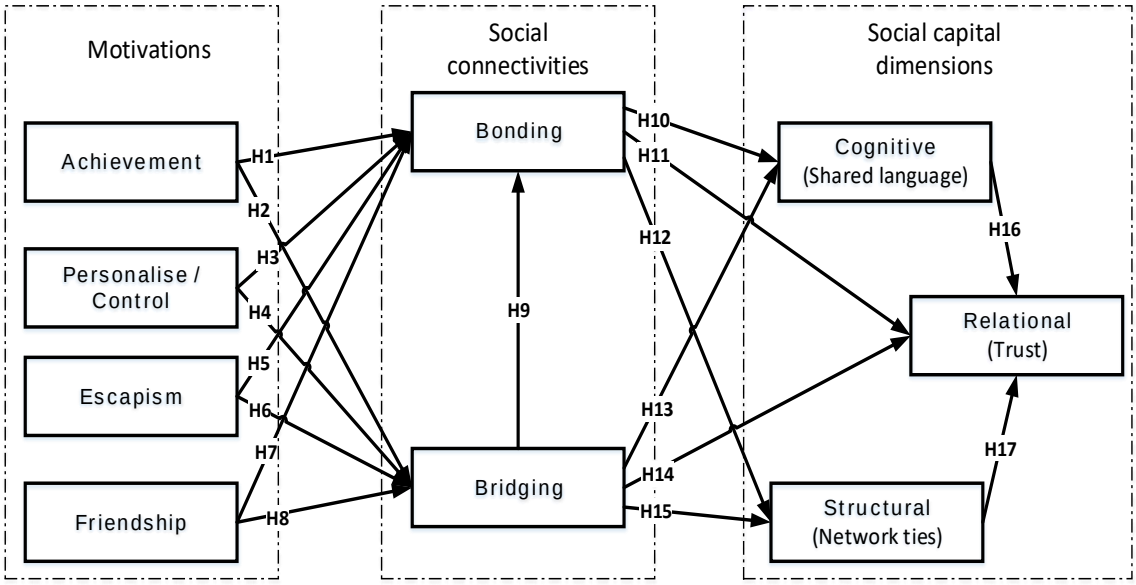


Figure 3.1: Research model

3.5. Chapter summary

This chapter discussed the process of developing the research model hypotheses. It looked at the findings of previous studies and, based on these findings, developed research hypotheses that support the research question. These developed hypotheses are displayed as a research model in Figure 3.1.

CHAPTER 4

4. METHODOLOGY

4.1. Overview

This chapter covers the methodology used in this study. The research design and analytical path of this research programme have a specific methodological direction based on the research objective and design framework. The proposed research framework model illustrated in Figure 3.1 links the relationships between VW end-user motives, social connectivities and social capital.

The empirical data captures responses from active end-users across three different VW platforms. Here, an online survey is appropriate to reach end-users in these global virtual communities. In addition, online surveying offers both replicability and statistical power.

4.2. Methodological approach

The research framework model (Figure 3.1) facilitates the empirical testing of the theoretical relationship pathways drawn from the literature and hypotheses presented in Chapter 3. To test the model, data were collected using an online survey.

Online surveying is a quantitative method based on the positives approach to explore scientific inquiry of phenomena. This also underlies the deductive method with shown hypothesised relationships (Garson, 2011). Such proposed relationships seek to quantify observable consequences by running statistical analyses and obtaining results that test whether the hypothesised relationship holds or not (Garson, 2011).

Cooper and Schindler (2001) interpret causal hypotheses as directional and obvious from the nature of the constructs under investigation. Causal hypothesis testing is suitable for mature scientific applications—particularly where the research approach aim to match underlying assumptions against scientific observations (Kuhn, 1970). From an objective prospective, this study statistically and scientifically answers the research questions. The study holds some inherent limitations, and it is not designed to reveal the potential rich details of individual phenomena.

4.3. Sampling procedures

This study focused on sampling the active end-user of VW popular platforms of SL, EU, and WOW, with SL representing SVWs, EU representing MVWs and WOW representing GVWs.

Each participant (represented through an avatar in one of these three VW platforms) was invited to participate in the study's online survey. The online survey was deployed through Survey Monkey (www.surveymonkey.com) as an appropriate tool for global data collection—specifically targeting English speaking active end-users. Survey monkey facilitates an easy solution to export respondent data into Excel or SPSS.

The size of sample in the extant literature that target SL, EU and/or WOW, which uses survey as the data collection method, ranged from a low of 93 (Jung & Pawlowski, 2014b) to a high of 606 (Constantiou, Legarth, & Olsen, 2012).

The standard and sophisticated statistical analysis, including structural equation modelling (SEM), recommends a sample size of 200 to test a model framework (Hair, Anderson, Tatham, & Black, 2010). Hoelter (1983) suggested 200 as the minimum sample size for any common estimated procedure to be valid.

An adequate sample size is also required to assess the significance of the path model. The recommended ratio is 20 cases per model parameter (Cunningham, 2008; Hair et al., 2010). In general, the accuracy of a path analysis declines with decreasing sample size as well as with an increasing number of constructs.

This study only focuses on avatar-based VWs and, as mentioned above, it only includes SL, EU and WOW as virtual platforms of interest. The practical reason for excluding the other avatar-based VW is that these three VW platforms are by far the most popular VW for each type of the different VWs.

In an attempt to maximise the response rate (Dillman, 1978, 1983), respondents were invited to join the final online survey through instant messaging (IM) in the VWs, posts on discussion groups, forums, ads on online forms and Facebook groups related to SL,

WOW and EU. For example, the admin of Entropia Universe Facebook public group agreed to pin survey invitation prominently to the top of the group page (in a form of Facebook post) throughout this study's survey period.

The 10−15-minute 5-point Likert scale (1 = strongly agree, 5 = strongly disagree) online survey was distributed for sharing online and was available for a period of three months between 4 June 2015 and 6 September 2015.

The online survey was divided into two main parts. The first part focused on respondent end-user demographic information such as age, gender, education level, etc. The second part focused on the proposed research framework model measurement items and constructs.

Data were collected from 613 respondents. Three-hundred and thirty-nine responses were rejected due to declining to participate (9), surveys submitted from the same IP address (17) and from those using non-English words when answering the comments section (14), etc. The final usable sample size of this study is 274. The number of constructs in the proposed model totals nine, which means that the ratio lies within Hair et al.'s (2010) recommended ratio of 20:1 (or 180 measurement items).

4.4. Unit of Analysis

The unit of analysis is the level of aggregation, or the level of investigation of collected data. This can be an individual, a discipline, or a community (Sekaran & Bougie, 2013). As mentioned in Chapter 2, there are three main theories (gratification, social relationship and social capital) used in investigating active end-users as a unit of analysis.

4.5. Measuring of constructs

Podsakoff, MacKenzie, Lee and Podsakoff (2003) clearly indicated in their study that in behaviour research the observed relationship between predictor and criterion constructs can be significantly impacted by common method variance. Although estimates of the strength of the impact of common method biases vary, their average level is quite substantial.

First, to minimise maturation bias (time effect bias), all independent constructs, intermediate constructs and dependent constructs are collected at the same time (Hair et al., 2010). This research uses cross-section research setting rather longitudinal setting. The survey is designed to be completed in 10−15 minutes.

Second, to reduce measurement bias, this study adapts literature-defined measurement constructs from past studies. Furthermore, for consistency, all construct measures use the same 5-point Likert scale and the survey also includes some reverse-worded items. For example, respondents are asked to rate their perception of all nine construct measures.

Furthermore, an attempt was made to collect some demographic information such as age, gender, education level, etc. This information will be used to validate the collected data against the published data.

For measurement construct validity and reliability, this study follows the procedures suggested by Nunnally and Bernstein (1994). Content validity involves the subjective assessment of scale measures (Malhotra, 2007). Each construct should be well defined and measured in the content domain. For this study, almost all construct measures are derived from past studies and have an exploratory reliability in excess of 0.6 (Hair et al., 2010).

To validate the content, previous studies and literature were reviewed. Measures adopted were drawn from previous literature studies and reframed into this study's draft survey. After reviewing the draft survey, minor adjustments were made to its structure and content. Before publishing the final online survey, a pre-test of the draft survey was trialled by colleagues and academics at James Cook University. Their suggestions and recommendations were incorporated into a final survey's verbiage.

Chapter 3 discusses in detail the conceptual and operational definitions, hypothesised relationships and domain of measurement. Measuring constructs in the proposed model are discussed below.

4.5.1. End-user motives constructs

Achievement

The motive of achievement is measured by modifying achievement motive characteristics (Hassouneh & Brengman, 2014) p. 334 and (Zhou et al., 2011) p. 269 and applying them to VWs to maximise the usable responses. The developed survey asked the respondent to rate five questions on 5-point Likert scales, as shown in Table 4.1.

The survey items are exhibited below.

In the VW, I:

1. feel pleasure running a successful business
2. am very satisfied owning my own business
3. have built one of the best creations
4. enjoy building and creating things
5. try to earn as much (virtual) money as possible.

Control

The control motive modified Guo and Barnes's (2011) p. 311 measurement characteristics and applied them to VWs to maximise the usable responses. The developed survey asked the respondent to rate four questions on 5-point Likert scales, as shown in Table 4.1.

The survey items are exhibited below.

In the VW, it is important that:

1. my character (avatar) has uniqueness
2. my character (avatar) looks fashionable
3. I have some personalised virtual items
4. my character (avatar) looks different from others.

Escapism

The motive of escapism was measured by modifying escapism motive characteristics (Hassouneh & Brengman, 2014) p. 334, (Shelton, 2010) p. 1224 and (Partala, 2011) p.

795) so they applied to VWs to maximise the usable responses. The developed survey asked the respondent to rate six questions on 5-point Likert scales, as shown in Table 4.1.

The survey items are exhibited below.

In the VW, I:

1. like to escape the real world
2. can forget some real-life problems
3. can relieve my daily stress
4. can relax from my real-life reasonability
5. wish to have my avatar in real life
6. feel freedom in my relationships with others.

Friendship

The motive of friendship was measured by modifying friendship motive characteristics (Constantiou et al., 2012) p. 111, (Hassouneh & Brengman, 2014) p. 334 and (Suler, 2004) so they applied to VWs. The developed survey asked the respondent to rate four questions on 5-point Likert scales, as shown in Table 4.1.

The survey items are exhibited below.

In the VW, I:

1. find it easier to start a conversation with strangers
2. talk more about personal issues with my virtual friends
3. can remove some of my self-restraints
4. have a different personality than in real life.

4.5.2. Social connectivities constructs

Bridging

Weak ties (bridging) were measured by modifying weak ties characteristics (Marczewski, 2015) so they applied to VWs to maximise the usable responses. The

developed survey asked the respondent to rate five questions on 5-point Likert scales, as shown in Table 4.1.

The survey items are exhibited below.

In the VW, I like:

1. to help others in the VW
2. not to share knowledge with others
3. breaking rules
4. volunteer my time to the communities
5. to donate rewards to help others.

Bonding

Strong ties (bonding) measured by modifying strong ties characteristics (Hassouneh & Brengman, 2014) p. 334, (Zhang & Kaufman, 2015) p. 496 and (Ryan, Rigby, & Przybylski, 2006) p. 359 so they applied to VWs to maximise the usable responses. The developed survey asked the respondent to rate five questions on 5-point Likert scales, as shown in Table 4.1.

The survey items are exhibited below.

In the VW, I find it easier to:

1. start a conversation with strangers than in real life
2. have good friends
3. talk more about personal issue with VW friends than in real life
4. remove some of my self-restraints
5. have a lot of friends.

4.5.3. Social capital dimension constructs

Cognitive

Shared language was measured by modifying shared language characteristics (Chiu et al., 2006) p. 1879, (Chang & Chuang, 2011) p. 17, (Wang et al., 2016) p. 1045 and (Xiayu Chen et al., 2017) p. 10 so they applied to VWs to maximise the usable responses. The

developed survey asked the respondent to rate six questions on 5-point Likert scales, as shown in Table 4.1.

The survey items are exhibited below.

In the VW, community members:

1. use common terms and jargon
2. use understandable communication patterns during discussions
3. use understandable narrative forms to post messages
4. share the same vision of helping and solving problems for others
5. share the same goals of learning from each other
6. share the same values of pleasure from helping others.

Relational

Trust was measured by modifying trust characteristics (Chiu et al., 2006) p. 1879 and (Chang & Chuang, 2011) p. 17 so they applied to VWs to maximise the usable responses. The developed survey asked the respondent to rate six questions on 5-point Likert scales, as shown in Table 4.1.

The survey items are exhibited below.

In the VW, I:

1. know others will help me, so it is fair to help them
2. know others will help me if I need assistance
3. belong to the community
4. am close and together with the community
5. am positive towards the community
6. am proud to be a member of the community.

Structural

Ties were measured by modifying ties characteristics (Chiu et al., 2006) p. 1879 and (Chang & Chuang, 2011) p. 17 so they applied to VWs to maximise the usable responses. The developed survey asked the respondent to rate four questions on 5-point Likert scales, as shown in Table 4.1.

The survey items are exhibited below.

In the VW, I:

1. maintain close relationship with others
2. spend a lot of time interacting with others
3. know some members on a personal level
4. frequently communicate with others in the community.

4.6. Response rate and data collection procedure

The self-administrated online survey approach is deemed most appropriate for a widespread research program (Malhotra, 2007). The main strengths of this method are respondent anonymity, confidentiality and free expression and fair temporal response (Hair et al., 2010). This approach facilitates the monitoring of survey non-respondents, improves record keeping and helps generate uniform data from diverse respondents.

This approach also helps to minimise costs compared with other methods. However, like any other research data collection method, online surveys also have limitations. Considering these limitations, the online survey was distributed using instant message (IM) in VWs, posts on discussion groups, forums, advertisements on online forms and Facebook groups related to SL, WOW, and EU. This distribution approach allows the collection of data economically in a short period of time from scattered and diverse sources.

Past researchers suggested that it is hard to get people motivated to complete online surveys. Hence, the use of a variety of distribution approaches in multiple platforms enhances the response rate, reduces respondents' bias and increases measurement validity.

The online survey link (https://www.surveymonkey.com/r/Virtual-Worlds) was shared through the different platforms mentioned above. To further verify the respondents' usernames, a manual check was done to confirm participants were existing active users.

Attached to the survey was a covering letter and information sheet supporting the research and encouraging participation in the survey. It was stressed that the study was

being conducted only for academic purposes and that participation in this study was completely voluntary, anonymous and confidential. Access to supplied information would be limited to the university research only. It was expected that this process would maximise the usable responses.

Table 4.1: Summary of the Initial Items for Measuring Constructs

Item Development	Measurement Item
Achievement	**In VW, I**:
(Hassouneh & Brengman, 2014)	feel pleasure running a successful business
& (Zhou et al., 2011)	am very satisfied owning my own business
	have built one of the best creations
	enjoy building and creating things
	try to earn as much (virtual) money as possible
Control	**In the VW, it is important that**:
(Guo & Barnes, 2011)	my character (avatar) has uniqueness
	my character (avatar) looks fashionable
	I have some personalised virtual items
	my character (avatar) looks different from others
Escapism	**In the VW, I**:
(Hassouneh & Brengman, 2014),	like to escape the real world
(Shelton, 2010), & (Partala, 2011)	can forget some real-life problems
	can relieve my daily stress
	can relax from my real-life reasonability
	wish to have my avatar in real life
	feel freedom in my relationships with others
Friendship	**In the VW, I**:
(Constantiou et al., 2012),	find it easier to start a conversation with strangers
(Hassouneh & Brengman, 2014),	talk more about personal issues with my virtual friends
& (Suler, 2004)	can remove some of my self-restraints
	have a different personality than in real life
Bridging	**In the VW, I like**:
(Marczewski, 2015)	to help others in the VW
	not to share knowledge with others
	breaking rules
	volunteer my time to the communities
	to donate rewards to help others.
Bonding	**In the VW, I find it easier to:**
(Hassouneh & Brengman, 2014),	start a conversation with strangers than in real life
(Zhang & Kaufman, 2015), &	have good friends
(Ryan et al., 2006)	talk more about personal issues with VW friends than in real life
	remove some of my self-restraints
	have a lot of friends

Cognitive	**In the VW, community users:**
(Chiu et al., 2006), (Chang & Chuang, 2011), & (Wang et al., 2016)	use common terms and jargon use understandable communication patterns during discussions use understandable narrative forms to post messages share the same vision of helping and solving problems for others share the same goals of learning from each other share the same values of pleasure from helping others
Relational	**In the VW, I:**
(Chiu et al., 2006) & (Chang & Chuang, 2011)	know others will help me, so it is fair to help them know others will help me if I need assistance belong to the community am close and together with the community am positive towards the community am proud to be member of the community
Structural	**In VW, I:**
(Chiu et al., 2006) & (Chang & Chuang, 2011)	maintain close relationship with others spend a lot of time interacting with others know some members on a personal level frequently communicate with others in the community

4.7. Analysis of the data

4.7.1. Construct development & reliability

Before proceeding to test the research model, measurement construct reliability needs to be established. Construct validity is concerned with the extent to which an instrument measures the concepts that it purports to measure (Hair et al., 2010). This reliability can be examined through confirmatory factor analysis (CFA).

First, exploratory factor analysis (EFA) is conducted to establish internal consistency of measurement constructs and to determine whether each observed construct (item) should be retained or excluded. This process is followed by confirmatory factor analysis (CFA) to validate all construct measures of the research model.

The final selected 274 cases are used to test the construct measures and to test the hypothesised proposed framework model. Using confirmatory factor analysis (CFA) with maximum likelihood and 200 oblimin rotation, every measurement construct underwent elimination of any cross-load < 0.30. For acceptable reliability, each construct had a KMO > 0.6 and had a Bartlett's $p < 0.05$, with all residuals < 0.05 (Cunningham, 2008). Each construct's congeneric shape was also internally checked and cross checked, and reduced sequentially item by item, averaging to its (final construct)

single indicator composite construct. The final construct measures with required reliability and validity are explained in Chapter 5, Table 5.4.

4.7.2. Model testing

SEM is a powerful quantitative data analytical technique that estimates and tests the theoretical relationships among latent and observed constructs and combines regression and factor analysis. It is also a path analytical method for handling multiple relationships and assessing relationships from exploratory analysis to confirmatory analysis (Hair et al., 2010). SEM has been used in previous studies for examining causal impacts on social capital and to measure end-user motives in VWs (Basilisco & Cha, 2015; Hau et al., 2013).

SEM path analysis technique was used to test the research model. The path model was constructed and analysed using SPSS 22.

Path analysis consists of a group of models that illustrates the influence of a set of constructs on one another (Spaeth, 1975). Path analysis and multiple regression are considered to be closely related; in fact, path analysis is considered an extension of the regression model in which the causal model is tested. The main purpose for using path analysis is to estimate the magnitude and significance of hypothesised causal connections between different sets of constructs displayed through the use of path diagrams.

Each construct in the model needs to go through regression, regardless of whether this construct is dependent or independent in relation to the other constructs. Reproduction of the correlation matrix is done through the model and this reproduced matrix is compared with the observed correlation matrix as one method to determine goodness-of-fit.

A variety of goodness-of-fit indicators are calculated using AMOS 22 (Arbuckle, 1989), and used for path analysis. The proposed path analysis model contains end-user motives, social connectivities and social capital dimensions.

The model was tested by a structural equation modelling programme (AMOS 22) using the maximum-likelihood method of parameter estimation. This method allows for

simultaneous examination of multiple direct and indirect predicted paths. It provides global indices-of-fit between the theoretical model and the data. The following constructs were included in the proposed research framework model: achievement, escapism, friendship, control, bridging, bonding, cognitive, relational and structural (Figure 3.1).

4.8. Fit indices

The use of SEM has steadily increased in the business, end-user motives and social capital literature, where three forms of SEM are identified. The first form consists of a measurements model, the second form is a structural model and the third form combines measurements and structure in a single analysis (McQuitty, 2004).

In this study, the path model is an approach that combines measurements and structure in a single analysis.

SEM is a quantitative and statistical modelling technique. This technique estimates, specifies and tests theoretical relationships between observed endogenous constructs and latent, unobserved exogenous constructs (Byrne, 1994). SEM is a family of confirmatory analyses that combines analysis of covariance structure, regression and factor analysis.

The SEM approach begins with a model specification that links the constructs assumed to build relationship that affect other constructs and directions (Kline, 2011). Model specification is visually represented through theoretical hypotheses. In the estimation process, SEM produces regression weights, variance, covariance and correlation in its iterative procedures converged on a set of parameter estimates (Iacobucci, 2010; Schumacker & Lomax, 2004).

Goodness-of-fit indices are produced in the estimation process. Fit indices are then evaluated to check whether the proposed model is a fit to the data or not, or whether any modification is required to increase fit. The model fit indices are divided into three basic types: 1) absolute fit indices, 2) incremental or comparative fit indices and 3) indices of model parsimony.

In each type, there are different fit indices and some rules of thumb about the required minimum value for good fit (Arbuckle, 1989; Byrne, 1994). However, researchers emphasise that many different fit indices are found to have some problems in the evaluation process (Kline, 2011), because different fit indices are reported differently in different articles and different reviewers of the same manuscript suggest the indices that they prefer. For example, Kenny and McCoach (2003) argued that there is no consistent standard for evaluating an acceptable model and they only emphasised χ^2, CFI, TLI and RMSEA as commonly used fit indices.

4.8.1. Chi-square

Chi-square (χ^2) is a statistical method to assess the goodness-of-fit between a set of observed values and those expected theoretically. It measures the absolute discrepancy between the matrix of implied variances and covariance to the matrix of empirical sample variances and covariance.

This statistic tests whether the matrix of implied variances and covariance is significantly different to the matrix of sample variances and covariance. The model is considered as accepted if chi-square is not significant.

However, χ^2 is very sensitive in relation to the sample size and model complexity (Kenny & McCoach, 2003). When the sample size is large, the χ^2 test will show that the data are significantly different from those expected on a given theory even though the difference may be so very slight as to be negligible or unimportant on other criteria (Gulliksen & Tukey, 1958).

An alternative measure is through its associated degree of freedom (df). Some researchers have referred this as normed χ^2 or relative chi-square. Relative chi-square is the χ^2 measure per degree of freedom with an index of model parsimony (McQuitty, 2004).

Relative chi-square is less sensitive to sample size. Accordingly, a value of normed χ^2 greater than 1 and smaller than 2 indicates a very good model fit (Byrne, 1994; Hair et al., 2010). The accepted criterion varies across different researchers, ranging from less than 2 (Ullman, 2006) to less than 3 (Kline, 2011).

4.8.2. Root mean square error of approximation (RMSEA)

The Chi-square statics reflect the discrepancy between the observation covariance matrix derived from the data and the predicted covariance matrix by the model. Sample size is a critical element on which both chi-square and the multivariate normality in the data rely (Hu & Bentler, 1998). Therefore, we reported the root-mean-square error of approximation (RMSEA), which is used to calculate the estimated average absolute difference between the model covariance estimates and the observed covariance.

A value of < 0.05 for RMSEA indicates a close fit, whereas a value < 0.08 is still considered acceptable (Browne & Cudeck, 1992; Hu & Bentler, 1998; Steiger, 1990). Meanwhile, Vandenberg & Lance (2000) have recommended that a cut-off value of 0.10 for RMSEA is still accepted.

4.8.3. Comparative fit index (CFI)

In this study, we also calculated the comparative fit index (CFI). The CFI provides a measure that indicates better ways for the theoretical model to fit the data compared with a base model constraining all constructs to be uncorrelated with each other. The CFI is a more robust and reliable statistic than chi-square for models with constructs showing deviations from multivariate normality. A CFI value of 0.95 or above is considered a good fit (Hu & Bentler, 1998).

A model with a CFI of > 0.90 is occasionally considered an accepted model (Bentler, 1990; Vandenberg & Lance, 2000).

4.8.4. Other fit indices

Steenkamp, Batra, & Alden (2003) stressed that χ^2, TLI, and CFI as fit measures to test moderating effect of their proposed model. While Knight and Cavusgil (2004) reported CFI, TLI, IFI, RNI, and RMSEA as fit measures in their study. McQuitty (2004) suggested a set of goodness-of-fit indices that is less sensitive to sample size. These indices are TLI suggested by Marsh, Balla and McDonald (1988), IFI, TLI, CFI suggested by Bentler (1990), and RMSEA, CFI, and TLI suggested by Fan, Thompson and Wang (1999).

Hulland, Chow and Lam (1996) state it is difficult to apply all fit indices. In this study, a set of goodness-of-fit indices commonly used and reported in the literature (Bollen &

Stine, 1992; Hair et al., 2010; Hulland et al., 1996; Marsh et al., 1988) are used to assess the degree of overall fitness of the social capital motives model.

These indices are χ^2/df, RMSEA, CFI, PMR, GFI, Bollen-Stine P, TLI, and AGFI are considered in this study as shown in Table 4.2.

Table 4.2: Goodness-of-Fit Indices: Assessing Measurement and Structural Models

Fit Index	Description	Cut-offs (model fit)	Reference
χ2	Indicates the discrepancy between hypothesis model and data; tests the null hypothesis that the estimated covariance−variance matrix deviates from the sample variance−covariance matrix only because of sampling error.	$p > 0.05$	(Kenny & McCoach, 2003)
χ2 / df	Because the chi-square test is sensitive to sample size and is only meaningful if the degree of freedom is taken into account, its value is divided by the number of degrees if freedom.	2-1 or 3-1	(Kline, 2011; Ullman, 2006)
RMSEA	Shows how will the model fits the population covariance matrix, taking the number of degrees of freedom into consideration.	< 0.05: good fit; < 0.08: reasonable fit	(Browne & Cudeck, 1992; Hu & Bentler, 1998; Steiger, 1990)
GFI	Comparison of the squared residuals from prediction with the actual data, not adjusted for the degrees of freedom.	> 0.90	(Byrne, 1994)
AGFI	GFI adjusted for the degree of freedom.	> 0.90	(Hu & Bentler, 1998)
NNFI / TLI	Shows how much better the model fits, compared with a baseline model, normally the null model, adjusted for the degrees of freedom (can take a value greater than one).	> 0.90	(Hu & Bentler, 1998)
CFI	Shows how much better the model fits compared with a baseline model, normally the null model, adjusted for the degrees of freedom.	> 0.90	(Byrne, 1994; Hu & Bentler, 1998)

4.9. Chapter summary

This chapter discussed the research methodology used for the study and the process of measuring the constructs. It also looked at the measurement development used for the model testing, through discussing fit indicators used for different measures and the methods used to determine the developed research model goodness-of-fit. The results of these measures and goodness-of-fit will be discussed in detail in Chapter 5.

CHAPTER 5

5. RESULTS AND DISCUSSION

5.1. Overview

In this chapter, survey respondents' demographics, their characteristics, data screening, SEM social capital motives research model assessment and structural model fit are discussed. The research questions are examined and answered using t-test and SEM path analysis.

5.2. Data validation process

5.2.1. Examining of data entry and missing data

Data analysis proceeded with an examination of data entry and handling of missing data. This provided important critical insight into the data characteristics and analysis (Hair et al., 2010). To ensure data accuracy and completeness, data entry was double checked. Firstly, entries are verified case-by-case. Secondly, descriptive statistics (frequency distribution, mean and standard deviation) are checked.

The examination process of the returned surveys found that 22 collected surveys contained some missing data for some of the construct measurement sections. The surveys with missing data were more than 6% incomplete. The study eliminated those cases from the preliminary analysis (Hair et al., 2010).

Table 5.1 summarises the final outcome of this survey validation process. The final 274 surveys were reserved in the database (acceptance rate is 74.8%) to be examined, and for testing normality and outliers.

Table 5.1: Total Number of Responses (N = 365)

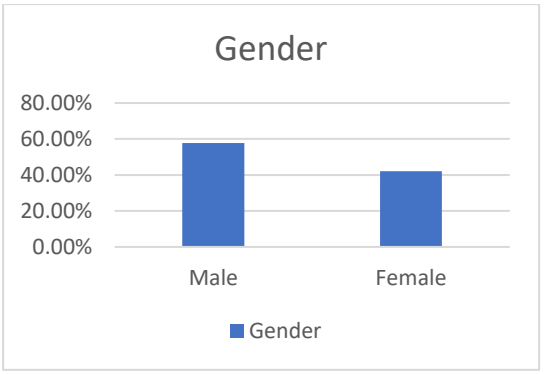
Filter No.	Filter Name (Description)	Total Invalids	Remaining Responses
1	Declined to take the survey	9	356
2	Not completed / missing data	22	334
3	Survey duration (less than 10 min)	29	305
4	Comment field was not in English	14	291
5	Duplicated IP address	17	274
Total number of valid responses after five filters = 274			

5.2.2. Validate data with previous and published data

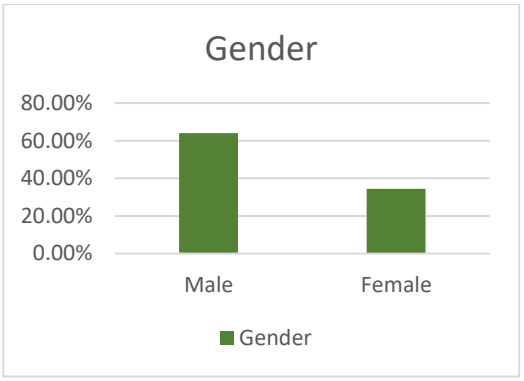
The demographic profile (age and gender) of the final 274 responses were plotted and compared with published data (Barnes & Pressey, 2011; Huvila et al., 2010; Kieger, 2010; Partala, 2011; statista.com, n.d.; Whippey, 2011) as shown in Figure 5.1

Figure 5.1: Comparing collected data with previous studies and published data

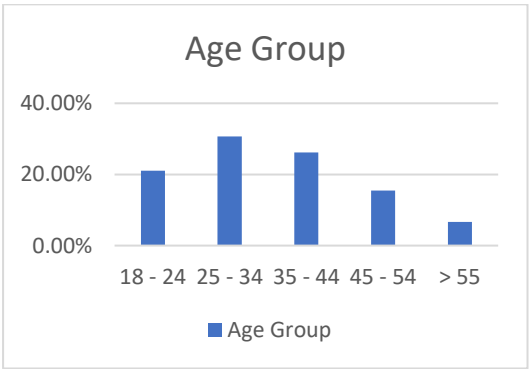
The research data

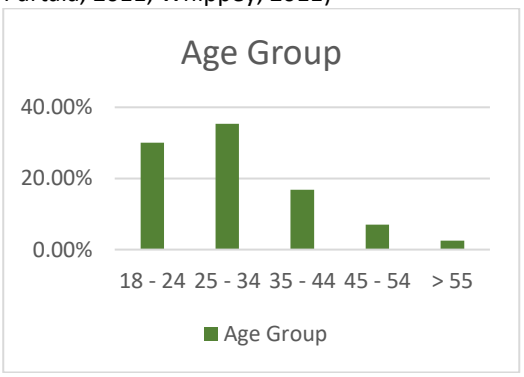


Published data



Sources: (Huvila et al., 2010; Kieger, 2010; Partala, 2011; Whippey, 2011)





Sources: (Barnes & Pressey, 2011; Kieger, 2010; statista.com, n.d.)

Both gender and age group profiles exhibit similar trends with the published data. This indicates the returned survey data has consistency and validity (Barnes & Pressey, 2011). This suggests that returned survey data is valid for use in this study and for representing the relative populations in SL, EU and WOW.

Further survey data segmentation for different VWs is shown in Table 5.2.

Table 5.2: Total Valid Responses from Different VWs

VW	No. of Responses
SL	85
EU	75
WOW	114
TOTAL	274

5.2.3. Respondent and end-user profiles

Table 5.3 shows that 57% of the 274 survey respondents were male and 43% were female. Fifty-four per cent of participants were under 35 years and 46% of participants were over 35 years. North American respondents totalled 49.6% while South America, Asia, Europe, Africa and Oceania together totalled 50.4%.

Table 5.3: Respondent Demographics (profile)

Demographic Measure	Percentage (%)
Gender	
Female	43.1%
Male	56.9%
Age	
18 to 24	23.7%
25 to 34	30.7%
35 to 44	24.8%
45 to 54	14.6%
55 or older	6.2%
Education	
High school	34.7%
Community college	13.1%
Undergraduate	13.9%
Graduate	31.0%
No answer	7.3%
Login frequency	
Less than once a month	1.5%
Once a month	1.5%
Once a week	5.8%
Several time a week	31.0%
Daily	60.2%
Region	
Other (please specify)	2.6%
North America	49.6%
South America	4.4%
Asia	3.3%
Europe	31.4%
Africa	1.5%
Oceania	7.3%
Middle East	0.0%

Further, 61.7 % of respondents were students, 31 % were university graduates and 7.3% provided no education-level information.

Most responses were from the North America region (49.6%) while those from South America, Asia, Europe, Africa and Oceania together comprised 50.4%. As there were several VWs with significant differences, we asked the respondents to visualise and report their preferred VW while responding to the survey questions. Most respondents (42%) reported WOW as their preferred VW, followed by SL (31%) and EU (27%).

The login frequency statistics (Table 5.3) show that more than 90% of the VW end-users use a VW platform at least once a week, indicating a high proportion are active VW end-users.

5.3. Normality and outliers' assessment

Data normality is usually a conventional assumption in the estimation process (Bai & Ng, 2005). Highly skewed and/or high kurtosis is indicative of non-normal data distribution (Winter, 2013) and may indicate the presence of outliers (Tabachnick & Fidell, 2012). Tabachnick and Fidell (2012, p. 66) argued that *"an outlier is a case with such an extreme value on one variable (a univariate outlier) or such a strange combination of scores on two or more variables (multivariate outlier) that they distort statistics"*.

Table 5.4: Descriptive Statistics

Variable	Minimum	Maximum	Mean	Std Dev	Skewness	Kurtosis
Achievement	1.00	5.00	3.095	0.944	-.086	-.380
Control	1.00	5.00	3.640	0.928	-.654	.188
Escapism	1.00	5.00	3.957	0.891	-.809	.514
Friendship	1.00	5.00	3.204	0.997	-.115	-.393
Bridging	1.00	5.00	3.623	0.716	-.333	.477
Bonding	1.00	5.00	3.849	0.940	-.769	.019
Cognitive	1.00	5.00	3.847	0.694	-.379	.610
Relational	1.00	5.00	3.775	0.777	-.504	.894
Structural	1.00	5.00	3.959	0.920	-.920	.838

Valid N = 274

The model constructs from Chapter 4 were assessed for normality and outliers. Normal distribution has a skewness of 0 and kurtosis within ± 3 (Glass, Peckham, & Sanders, 1972; Hair et al., 2010). Table 5.4 shows the skewness and kurtosis for each construct.

The skewness of each construct is near zero (0), with slightly negative skewness. The kurtosis of each constructs is well within the normality range. Since the sample size is small, the Shapiro−Wilks and Kolmogorov−Smirnov tests were not performed. However, the normality plots were examined and indicate near-normality (Hair et al., 2010).

An additional attempt was used to detect outliers (with extreme values that are unique from the rest). This attempt identifies univariate and multivariate outliers by evaluating Mahalanobis distances greater than χ^2 (9) = 30.143 (p < .001) (Tabachnick & Fidell, 2012).

The statistical diagnostics revealed five cases with a Mahalanobis distance greater than 30.143 (range: 31.640−41.026). These cases were removed individually to examine each impact on the SEM path model. Removing these five outlier cases has no significant impact: it does not change the SEM path model and did only minor changes in the model beta (β) path weight and no significant of the fit indices. Therefore, it was decided to retain these five cases for sample size purposes.

5.4. Results of measuring of constructs

5.4.1. End-user motives constructs

Achievement

The achievement motive was examined using five items. Initial inspection of the inter-item correlation matrix revealed that “achievement 1” and “achievement 5” were poorly correlated (residuals > 0.05) with the other items in the scale. Therefore, deletion of these two items and the engagement of the remaining three items (with residuals < 0.05) measuring achievement would not affect the content and face validity of the construct. The final construct is summarised in Table 5.5.

The achievement construct has a mean of 3.10, a standard deviation of 0.94 and Cronbach’s alpha is 0.73. This indicates a high level of internal consistency (Hair et al., 2010).

Control

The control motive was examined using four items. Initial inspection of the inter-item correlation matrix revealed that all four items were strongly correlated with each other in the scale. Therefore, using the four items (residuals < 0.05) provided a strong measure of the control construct. The final construct is summarised in Table 5.5.

The control construct has a mean of 3.64, a standard deviation of 0.93 and Cronbach's alpha is 0.87. This indicates a high level of internal consistency (Hair et al., 2010).

Escapism

The escapism motive was examined using six items. Initial inspection of the inter-item correlation matrix revealed that "escapism 5" and "escapism 6" were poorly correlated (residuals > 0.05) with the other items in the scale. Therefore, deletion of these two items and the engagement of the remaining four items (with residuals < 0.05) measuring escapism would not affect the content and face validity of the measurements. The final construct is summarised in Table 5.5.

The escapism construct has a mean of 3.96, a standard deviation of 0.89 and Cronbach's alpha is 0.88. This indicates a high level of internal consistency (Hair et al., 2010).

Friendship

The friendship motive was examined using four items. Initial inspection of the inter-item correlation matrix revealed that "friendship 4" was poorly correlated (residuals > 0.05) with the other items in the scale. Therefore, deletion of one item and the engagement of the remaining three items (with residuals < 0.05) measuring friendship would not affect the content and face validity of the construct. This final construct is summarised in Table 5.5.

The friendship construct has a mean of 3.20, a standard deviation of 0.98 and a range from 1.57 to 5.00. This construct's Cronbach's alpha is 0.75, which indicates a high level of internal consistency (Hair et al., 2010).

5.4.2. Social connectivities constructs

Bridging

Weak ties (bridging) was examined using five items. Initial inspection of the inter-item correlation matrix revealed that “bridging 2” and “bridging 3” were poorly correlated (residuals > 0.05) with the other items in the scale. Therefore, deletion of these two items and engagement of the remaining three items (with residuals < 0.05) measuring bridging would not affect the content and face validity of the construct. The final construct is summarised in Table 5.5.

The bridging construct has a mean of 3.62, a standard deviation of 0.72 and Cronbach’s alpha is 0.65. This indicates a high level of internal consistency (Hair et al., 2010).

Bonding

Strong ties (bonding) was examined using five items. Initial inspection of the inter-item correlation matrix revealed that “bonding 2” and “bonding 5” were poorly correlated (residuals > 0.05) with the other items in the scale. Therefore, deletion of these two items and the engagement of the remaining three items (with residuals < 0.05) would not affect the content and face validity of the bonding construct. This final construct is summarised in Table 5.5.

The bonding construct has a mean of 3.85, a standard deviation of 0.94 and Cronbach’s alpha is 0.82. This indicates a high level of internal consistency (Hair et al., 2010).

5.4.3. Social capital dimensions constructs

Cognitive

Shared language measured used six items. Initial inspection of the inter-item correlation matrix revealed that shared language “cognitive 4”, “cognitive 5” and “cognitive 6” were poorly correlated (residuals > 0.05) with the other items in the scale. Therefore, deletion of these three items and the engagement of the remaining three items (with residuals < 0.05) measuring shared language would not affect the content and face validity of the construct. The final construct is summarised in Table 5.5.

The shared language construct has a mean of 3.85 a standard deviation of 0.69 and Cronbach's alpha is 0.78. This indicates a high level of internal consistency (Hair et al., 2010).

Relational

Trust used six items. Initial inspection of the inter-item correlation matrix revealed that "trust 1", "trust 2" and "trust 6" were poorly correlated (residuals > 0.05) with the other items in the scale. Therefore, deletion of these three items and the engagement of the remaining three items (with residuals < 0.05) measuring trust would not affect the content and face validity of the construct. The final construct is summarised in Table 5.5.

The trust construct has a mean of 3.77, a standard deviation of 0.78 and Cronbach's alpha is 0.90. This indicates a high level of internal consistency (Hair et al., 2010).

Structural

Network ties were examined using four items. Initial inspection of the inter-item correlation matrix revealed that "structural 4" was poorly correlated (residuals > 0.05) with the other items in the scale. Therefore, deletion of the one item and the engagement of the remaining three items (with residuals < 0.05) measuring ties would not affect the content and face validity of the construct.

The network ties construct has a mean of 3.96, a standard deviation of 0.92 and Cronbach's alpha is 0.74. This indicates a high level of internal consistency (Hair et al., 2010).

The final construct is summarised in Table 5.5.

Table 5.5: Social Capital Model Constructs

Item Development	Measurement Item	Item Load	Mean	SD	Cronbach's Alpha (α)	AVE
Achievement (Hassouneh & Brengman, 2014) & (Zhou et al., 2011)	**In the VW, I**:		3.095	0.944	0.731	0.509
	am very satisfied owning my own business	0.613				
	have built one of the best creations	0.908				
	enjoy building and creating things	0.572				

Control (Guo & Barnes, 2011)	**In the VW, it is important that**:		3.640	0.928	0.867	0.625
	my character (avatar) has uniqueness	0.822				
	my character (avatar) looks fashionable	0.791				
	I have some personalised virtual items	0.707				
	my character (avatar) looks different from others	0.836				
Escapism (Hassouneh & Brengman, 2014), (Shelton, 2010), & (Partala, 2011)	**In the VW, I**:		3.957	0.891	0.881	0.652
	like to escape the real world	0.755				
	can forget some real-life problems	0.852				
	can relieve my daily stress	0.773				
	can relax from my real-life reasonability	0.846				
Friendship (Constantiou et al., 2012), (Hassouneh & Brengman, 2014), & (Suler, 2004)	**In the VW, I**:		3.204	0.997	0.749	0.502
	find it easier to start a conversation with strangers	0.656				
	talk more about personal issues with my virtual friends	0.713				
	can remove some of my self-restraints	0.755				
Bridging (Marczewski, 2015)	**In the VW, I like**:		3.623	0.716	0.651	0.396
	to help others in VW	0.492				
	volunteer my time to the community	0.666				
	to donate rewards to help others	0.710				
Bonding (Hassouneh & Brengman, 2014), (Zhang & Kaufman, 2015), & (Ryan et al., 2006)	**In VW, I find it easier to:**		3.849	0.940	0.817	0.615
	start a conversation with strangers than in real life	0.692				
	talk more about personal issues with VW friends than in real life	0.805				
	remove some of my self-restraints	0.849				
Cognitive (Chiu et al., 2006), (Chang & Chuang, 2011), & (Wang et al., 2016)	**In the VW, community users:**		3.847	0.694	0.780	0.566
	use common terms and jargons	0.594				
	use understandable communication patters during discussions	0.901				
	use understandable narrative forms to post messages	0.731				
Relational (Chiu et al., 2006) & (Chang & Chuang, 2011)	**In the VW, I:**		3.775	0.777	0.897	0.746
	belong to the community	0.845				
	am close and together in the community	0.885				
	am positive towards the community	0.862				
Structural (Chiu et al., 2006) & (Chang & Chuang, 2011)	**In the VW, I:**		3.959	0.920	0.892	0.736
	maintain close relationships with others	0.923				
	spend a lot of time interacting with others	0.819				
	know some members on a personal level	0.828				

In summary, all items load within the accepted range of 0.50 or greater and are considered practically significant by (Hair et al., 2010). Further, Hair et al. (2010) suggested Cronbach's alpha above 0.60 is acceptable for exploratory research. The Cronbach's alpha of the constructs in Table 5.5 are above the recommended value of 0.60. When examining construct validity using AVE, all constructs but one were over 0.50 (Hair et al., 2010). The bridging construct contains one item that loads at 0.49, which lowers the AVE for this construct. However, it was necessary to retain this item and then deliver the bridging factor. Overall, Table 5.5 indicates internal consistency and reliability of the constructs.

5.5. Overall SEM social capital motives model fit

The SEM social capital motives model shows no additional significant paths are lacking and all existing paths have *p* values < 0.05. Further, no extra (redundant) paths remain in the model (all remaining MI's < 4.0). This study's social capital motives model shows consistent very good fit across all the SEM goodness-of-fit measures deployed for this study's smallish (refer Chapter 4) dataset. The fit measures deployed in Table 5.6 are those specifically designed to test fit when small datasets (100−400) are studied (Hair et al., 2010).

Table 5.6: Goodness-of-Fit Measures

	χ2/df	**RMSEA**	**CFI**	**RMR**	**GFI**	**Bollen-Stine P**	**TLI**	**AGFI**
Actual	1.895	0.057	0.975	0.033	0.973	0.144	0.949	0.934
Good fit	2-1 or 3-1	< 0.05: good fit; < 0.08: reasonable fit	> 0.90	< 0.05	> 0.90	> 0.05	> 0.90	> 0.90
Reference	(Kline, 2011; Ullman, 2006)	(Browne & Cudeck, 1992; Hu & Bentler, 1998; Steiger, 1990)	(Byrne, 1994; Hu & Bentler, 1998)	(Tabachnick & Fidell, 2012)	(Byrne, 1994)	(Bollen & Stine, 1992)	(Hu & Bentler, 1998)	(Hu & Bentler, 1998)

The normed Chi-square (χ^2/df = 1.90, *P* (Bollen-Stine) = 0.14 indicate a very strong model exists (Cunningham, 2008; Schumacker & Lomax, 2004). The GFI-AGFI value of 0.04 is under 0.06 and both measures are above 0.90, which again suggests an excellent model (Cunningham, 2008). The Tucker Lewis Index (TLI) and the comparative fit index

(CFI) values are 0.95 or better, again showing an excellent model fit exists (Bentler, 1990; Hair et al., 2010). Both the RMR and RMSEA are below their threshold values and, therefore, support a very good model fit (Hair et al., 2010). Thus, across all measures, the SEM social capital motives model delivers an excellent fit, indicating a valid path model exists between this study's constructs and that 12 of the hypothesised (and literature-supported) pathways are significant.

5.6. SEM social capital motives model

This section assesses research questions two and four: "Do end-user motives influence social connectivities?" (RQ2) and "Does social connectivities differentially influence social capital?" (RQ4).

5.6.1. Path modelling

The resultant SEM social capital motives model developed from Figure 3.1 is presented as Figure 5.2. This model indicates the existence of 12 significant VW path segments ($p < 0.05$). Each significant path segment within the SEM social capital motives model supports a proposed literature-developed hypothesis. Each path segment is shown in Figure 5.2 with its standardised regression coefficient beta weight (and its *p*-level significance). This model has a very high quality fit. It is validated via bootstrapping (x200), which converges quickly within 17 bootstraps.

The SEM social capital motives model shows that: (1) VW motives relate to VW social capital via a two-stage process, (2) none of this study's four VW motive constructs directly deliver VW social capital and (3) the VW social connectivities constructs of bridging and bonding act as a two-step intermediaries stage in the development of VW social capital within the SEM social capital motives model.

Social capital has three dimensions and is also a two-step outcomes system, with relational (trust) social capital being the ultimate SEM social capital motives model driver.

Further, different motive constructs individually exert different influences across the two-stage SEM social capital motives model. For example, the achievement motive only has a 21% influence on the bridging intermediary and the bridging intermediary, in turn,

exerts a 30% influence onto bonding and a 14% influence directly onto the cognitive social dimension, with further achievement indirect effects through bridging and bonding exerted onto cognitive, structural and relational. In contrast, the escapism motive directly affects both bridging (19%) and bonding (13%), and these, in turn, transmit escapism effects onto the social capital dimensions. Thus, VW end-user motives do influence social connectivities (RQ2) and VW social connectivities does differentially influence social capital (RQ4).

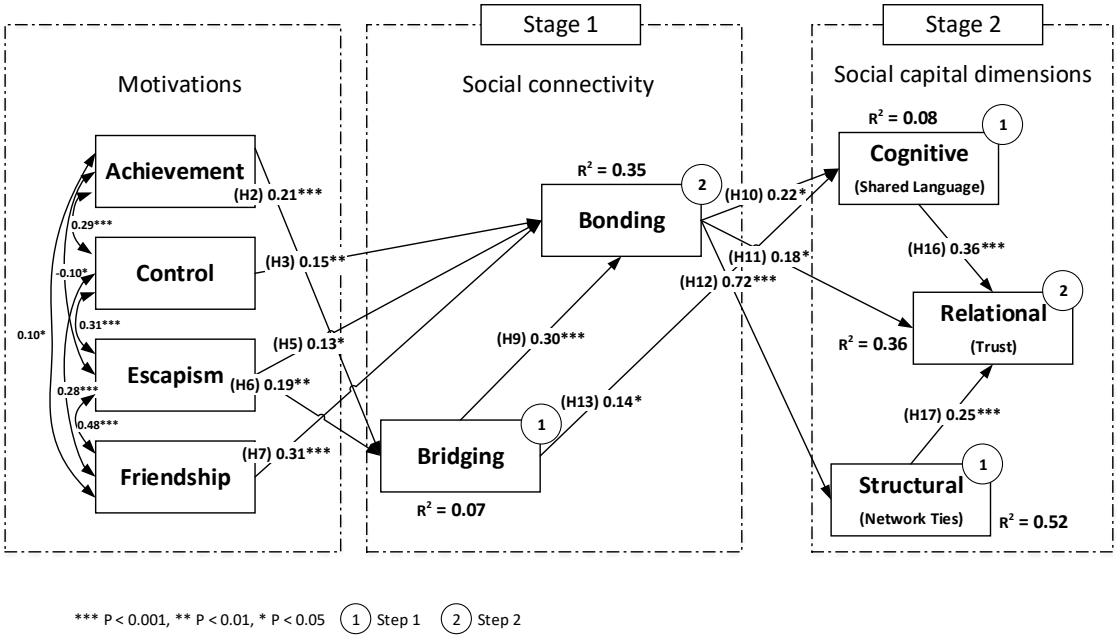


Figure 5.2: Social capital motives model

Finally, the SEM social capital motives model offers a new way to investigate the motive development of end-users when acquiring social capital in VWs. It highlights that the intermediate stage of social connectivities is necessary before social capital can be delivered, and that social connectivities is sometimes (in the case of the achievement motive or escapism) either a direst stage one to stage two social capital process or, alternatively, it is an indirect two-step intermediary stage process into the stage two social capital constructs that exist in the three VWs (SL, EU, WOW).

The model further highlights that stage two social capital development is a two-step process, with relational social capital being the ultimate driver of end-user motives engagement in VWs.

5.6.2. Hypotheses testing

The remaining five unsupported hypotheses, along with the supported 12 hypotheses, are tabulated in Table 5.7.

Control and friendship motives do not significantly affect bridging as these are strong personal, self-directed and/or teamed social connectivities drivers. This supports Hassouneh and Brengman's 2014 study that suggested end-users motivated by friendship keep close relationships (stronger social connectivities) with other members and usually have meaningful conversations with them. This supports friendship-motivated end-users being more likely to develop bonding social connectivities than bridging.

For example, end-users engaged in VWs make new friends and relationships. They look to share their feelings and personal problems with other members of the community. This takes the relationship to a stronger and more connected (i.e. tied) level of social connectivities than bridging alone.

Similarly, the weak connectivities of bridging does not directly affect the strong social connectivities of the structural aspect, where strong networked ties between end-users exist, or the relational aspect, where trust between end-users is the priority. Hence, the absence of these four pathways is quite likely. This likely outcome aligns with this study's findings.

For example, a community with weak social connectivities is less connected together and likely has a strong network of ties among them. At the same time, these weak network ties may not lead to a high level of trust among community members. Therefore, weak social connectivities likely leads to weaker network ties between communities and a lower level of trust.

Achievement is an end-user motive that can vary in its contributions towards social capital and is likely a lower effector than the other motives. Hence, the absence of an achievement to bonding pathway is quite likely. This path absence is also in line with this study's findings. For example, end-users who are motivated to achieve a personal goal (such as making money) are likely to achieve their personal goal by any means,

without considering others. In most of cases, they may not consider other members' emotions, feelings or social problems. These may be considered distracting factors from their main achievement or, at least, as impediments that slow the process of achieving their goals.

Table 5.7: SEM Output for Hypothesised Paths in Hypothesis Model Figure 5.2

No.	Hypotheses	Path	SEM				Results *
			β	S.E.	C.R. (t)	P	
H1	Achievement motives positively influence bonding.	Achievement >> Bonding	-	-	-	-	Not supported
H2	Achievement motives positively influence bridging.	Achievement >> Bridging	0.21 ***	.044	3.569	***	Supported
H3	Control motives positively influence bonding.	Control >> Bonding	0.15 **	.053	2.946	.003	Supported
H4	Control motives positively influence bridging.	Control >> Bridging	-	-	-	-	Not supported
H5	Escapism motives positively influence bonding.	Escapism >> Bonding	0.13 *				Supported
H6	Escapism motives positively influence bridging.	Escapism >> Bridging	0.19 **	.047	3.265	.001	Supported
H7	Friendship motives positively influence bonding.	Friendship >> Bonding	0.31 ***	.061	2.285	.022	Supported
H8	Friendship motives positively influence bridging.	Friendship >> Bridging	-	-	-	-	Not supported
H9	Bridging positively influences bonding.	Bridging >> Bonding	0.30 ***	.065	6.124	***	Supported
H10	Bonding positively influences the attitude towards cognitive social capital.	Bonding >> Cognitive	0.22 *	.046	3.472	***	Supported
H11	Bonding connectivities positively influences relational social capital.	Bonding >> Relational	0.18 *	.058	2.591	.010	Supported
H12	Bonding connectivities positively influences structural social capital.	Bonding >> Structural	0.72 ***	.041	17.293	***	Supported
H13	Bridging positively influences the attitude towards cognitive social capital.	Bridging >> Cognitive	0.14 *	.061	2.171	.030	Supported
H14	Bridging positively influences relational social capital.	Bridging >> Relational	-	-	-	-	Not supported
H15	Bridging positively influences structural social capital.	Bridging >> Structural	-	-	-	-	Not supported
H16	Cognitive capital positively influences relational social capital.	Cognitive >> Relational	0.36 ***	.056	7.252	***	Supported
H17	Structural capital positively influences relational social capital.	Structural >> Relational	0.25 ***	.059	3.510	***	Supported

* Results supported at significance levels: $p \leq .001$, $p \leq .01$, $p \leq .05$ and $p \leq .10$

5.7. t-test results

The answers to research questions one ("Are VW end-user motives to participate (and to engage) different in each VW?") and research question three ("Are there differences in influence between the three VWs?") are provided via the t-test analysis. The t-test compares the different VWs targeted in this study (SL, EU and WOW) and identifies significant differences of end-user motives in different VWs. The t-test also tests significant differences of the research constructs in different VWs.

5.7.1. End-user motives: significant differences

The independent sample t-test determines active end-user motive differences between the different VWs. Table 5.8 summarises the significant differences of all end-user motives used within the different VWs in this study.

Table 5.8: T-Test with Tukey HSD Test for Active End-User Motives

Construct	Main VW	Compared VW	Mean Differences	Std. Error	Sig.
		Achievement			
Achievement	SL	EU	.20758	.14541	0.328
		WOW	.54	.13154	0.000
	EU	SL	-.21	.14541	0.328
		WOW	.33263*	.13647	0.041
	WOW	SL	-.54021*	.13154	0.000
		EU	-.33263*	.13647	0.041
		Control			
Control	SL	EU	.60039*	.14289	0.000
		WOW	.34399*	.12926	0.022
	EU	SL	-.60039*	.14289	0.000
		WOW	-.25640	.13410	0.137
	WOW	SL	-.34399*	.12926	0.022
		EU	.25640	.13410	0.137
		Escapism			
Escapism	SL	EU	.34941*	.13532	0.028
		WOW	-.29647*	.12241	0.042
	EU	SL	-.34941*	.13532	0.028
		WOW	-.64588*	.12699	0.000
	WOW	SL	.29647*	.12241	0.042
		EU	.64588*	.12699	0.000
		Friendship			
Friendship	SL	EU	.50327*	.15176	0.003
		WOW	-.20024	.13728	0.313
	EU	SL	-.50327*	.15176	0.003
		WOW	-.70351*	.14243	0.000
	WOW	SL	.20024	.13728	0.131
		EU	.70351*	.14243	0.000

* The mean difference is significant at the 0.05 level

Results show the achievements motive is significant for SL against WOW and for EU against WOW and insignificant for SL against EU. The control, escapism and friendship motives also display significant differences in end-user motives used within the different VWs of this study. SL is different in its control motives, escapism is different in its EU motives and friendship is different in its EU differences.

5.7.2. Social connectivities: significant differences

A second independent sample t-test identified differences in social connectivities between the different VWs. Table 5.9 details the significant differences between the social connectivities constructs (bridging and bonding). The results displayed in Table 5.9 that there is no significant difference between end-users of different VWs. However, considering bonding connectivities, there is a significant ($p < 0.05$) difference between EU and both SL and WOW.

Table 5.9: T-Test with Tukey HSD Test for Social Connectivities

Construct	Main VW	Compared VW	Mean Differences	Std. Error	Sig.
		Bridging			
Bridging	SL	EU	.15320	.11324	0.367
		WOW	-.03323	.10244	0.944
	EU	SL	-.15320	.11324	0.367
		WOW	-.18643	.10628	0.187
	WOW	SL	.03323	.10244	0.944
		EU	.18643	.10628	0.187
		Bonding			
Bonding	SL	EU	.83163*	.13910	0.000
		WOW	.12649	.12583	0.574
	EU	SL	-.83163*	.13910	0.000
		WOW	-.70515*	.13054	0.000
	WOW	SL	-.12649	.12583	0.574
		EU	.70515*	.13054	0.000

* The mean difference is significant at the 0.05 level

5.7.3. Social capital dimensions: significant differences

The third independent sample t-test identifies the differences in the social capital dimensions within the different VWs. As Table 5.10 illustrates, both cognitive (shared language) and relational (trust) social capital dimensions do not differ significantly (p <0.05) for end-user groups within the three VWs. Conversely, the structural social capital dimension (network ties) shows significant ($p < 0.05$) differences between EU and both SL and WOW.

The above independent sample t-test results answer research questions one and three as they show significant end-user differences do exist in the constructs deployed within the different VWs. They also add to the SEM social capital motives model research question findings and, collectively, the model and t-test support the overall research question that end-user motives do influence social capital dimensions in the virtual world.

The direct and indirect effects of end-user motives are discussed in Chapter 6.

Table 5.10: T-Test with Tukey HSD Test for Social Capital Dimensions

Construct	Main VW	Compared VW	Mean Differences	Std. Error	Sig.
		Cognitive			
Cognitive	SL	EU	.01438	.10977	0.991
		WOW	-.14059	.09930	0.334
	EU	SL	-.01438	.10977	0.991
		WOW	-.15497	.10302	0.290
	WOW	SL	.14059	.09930	0.334
		EU	.15497	.10302	0.290
		Relational			
Relational	SL	EU	.01516	.12329	0.992
		WOW	.09739	.11152	0.658
	EU	SL	-.01516	.12329	0.992
		WOW	.08222	.11570	0.757
	WOW	SL	-.09739	.11152	0.658
		EU	-.08222	.11570	0.757
		Structural			
Structural	SL	EU	.67033*	.14029	0.000
		WOW	.23337	.12691	0.159
	EU	SL	-.67033*	.14029	0.000
		WOW	-.43696*	.13166	0.003
	WOW	SL	-.23337	.12691	0.159
		EU	.43696*	.13166	0.003

* The mean difference is significant at the 0.05 level

5.8. Chapter summary

This chapter summarises the analysis of responses to the online survey. The findings considered include demographics (age, education, login frequency and region), data validation, measurement constructs, SEM model fit, validation, independent t-test findings, hypotheses and research questions. Twelve of the seventeen hypotheses proposed in Chapter 3 model were supported as significant. The contributions, limitations and future opportunities around these results are discussed in Chapter 6.

CHAPTER 6

6. CONCLUSION, LIMITATIONS, AND IMPLICATIONS

6.1. Overview and introduction

This chapter summarises the research findings, discusses the research implications, acknowledges research limitations and highlights future research opportunities.

6.2. Key findings

End-user motives and social capital have been widely studied in online gaming environments (Xiayu Chen et al., 2017; Hassouneh & Brengman, 2014; Hau & Kim, 2011). However, providing a clear relationship between end-user motives and social capital is critical to understand the creation of social capital. Very few previous studies have combined end-user motives with aspects of social capital (Hassouneh & Brengman, 2014; Moschetti & Hudley, 2015; Przybylski et al., 2010).

Further, to date, no studies have considered the possibility of an intermediary between end-user motives and the generation of social capital. Hence, this study defines bridging and bonding social connectivities as intermediates between end-user motives and social capital.

To investigate the relationship between end-user motives, social connectivities and social capital dimensions, three theories (gratification, social relationship and social capital), supported by an extensive literature review, were applied to explain this phenomenon.

The literature review identified antecedents including achievement, control, escapism and friendship, which were adopted as end-user motives in three VWs. Bridging and bonding were applied as intermediate proxies for social connectivities. The literature definitions for cognitive, relational and structural constructs were adopted as the overall dimensions of social capital in VWs.

Several t-tests were applied along with a SEM path model to answer the research questions and examine the relationships within this process (Chapter 3). A carefully considered methodology was engaged to collect data from a global pool of active end-users engaged in the targeted VWs (SL, EU, WOW).

The three t-test sets show that end-user motives, social connectivities and social capital dimensions were different among the different end-users of the targeted VWs. The resultant SEM path model also displayed a very good goodness-of-fit (Chapter 5).

Of the 17 proposed hypotheses, 12 hypothesised paths were found to be significant and theoretically justified. In summary, the results of the proposed research model output indicated that achievement and escapism have a significant positive effect on bridging (supporting H2 and H6), whereas control, escapism and friendship have a significant positive effect on bonding (supporting H3, H5 and H7).

Further, bridging was found to have a strong positive effect on bonding (supporting H9). Bridging had a positive influence on cognitive (supporting H3). Bonding had a positive effect on cognitive, relational and structural (supporting H10, H11 and H13). Both cognitive and structural were found to have a significant effect on relational social capital (supporting H16 and H17).

Overall, this research concludes that end-user motives influence social capital dimensions in the VWs. It also indicates that end-user motives are different in each VW. Different end-user motives influence social connectivities in different ways: achievement and escapism produce weak social connectivities, whereas control, escapism and friendship generate strong social connectivities. Moreover, weak social connectivities, over time, can develop strong connectivities.

In addition, social connectivities effects were different in the different targeted VWs. Both bonding and bridging social connectivities influence social capital dimensions in different ways. Weak social connectivities (bridging) influences only the cognitive social capital dimension, whereas strong social connectivities (bonding) influences all aspects of social capital dimensions.

6.3. Overall contribution

The study contributes towards research within international business and information technology fields.

Theoretically, this study's two-stage SEM path model integrates three theories (gratification, social relationship and social capital). Empirically, this research redefines social connectivities (bonding and bridging) as the first stage of social capital development. This research demonstrates that end-user motives can indirectly influence social capital dimensions via the intermediaries of social connectivities.

Unlike previous studies, where social capital is referred to as bonding and bridging or, alternatively, as one or more social capital dimensions, this study's two-stage model clearly demonstrates that social connectivities and social capital dimensions are interrelated and not independent social capital components as shown in earlier studies.

For example, Jin (2014) looked at the effect of social network game players' motives and the social effect on their psychological subjective well-being. Hassouneh and Brengman (2014) and Zhou et al. (2011) only investigated end-user motives to engage or participate in SVWs.

From a managerial perspective, businesses engaged in the VW environment can use the model approach to understand end-user motives and behaviour and, thereby, develop strategies to facilitate, encourage and strengthen interactions among existing end-users and, consequently, attract new end-users.

For example, enhancing a VW platform with virtual reality (VR) 3D glasses, such as Oculus Rift, can extend interactions among VW end-users and VW end-users with their surrounding environments. This may extend existing VW communities or it may help form new expanded VW communities. This can encourage end-user loyalty and, therefore, business continuity. This study's findings could also apply to other SNSs such as Facebook and Google plus.

6.4. Theoretical implications

This study contributes to the literature by showing that end-user motives influence social connectivities which, in turn, influences social capital dimensions. This finding addresses the research gap and links the end-user motives to social capital dimensions in VWs.

The study contributes to the academic body of knowledge showing that end-user motives have an indirect effect on the formation of social capital dimensions through social connectivities. These indirect effects on social capital acquisition differ from one VW to another. This is of benefit to researchers of VW platforms when developing more specific research strategies.

This two-stage social capital motives model can be adapted into social media research. For example, in Facebook, researchers can apply the model to further understand social media end-user motives and the generation of social capital dimensions through social connectivities. This can help in developing a comparison study between SNSs and VWs and, thereby, further the understanding of similarities and differences between online gaming platforms and social platforms.

The t-test (Table 5.8) shows differences between end-user motives of achievement, control, escapism and friendship. This result relates to Figure 1.1, which shows SL, EU and WOW to lie across different quadrants of dynamic content creation and different levels of gaming to social orientation.

These results suggest that in the future there is likely a necessity to standardise VWs end-user motives across any online platform. This can be achieved through migrating and integrating the different VWs platforms towards dynamic, interactive social/gaming environments. An example of this integration is when Facebook launched its instant games feature in November 2016, which offered games inside the Messenger app and news feeds (Tucker, 2016).

The t-test results in Table 5.9 indicate that bonding exists within the three targeted VWs. However, the nature of bonding connectivities differs among the three VWs. This may be due to different types of bonding including financial/economic bonding,

social/personal bonding and/or teamwork bonding. This suggests a possible area of further VW research.

The social capital motives model Figure 5.2 clearly indicates that bonding connectivities influences all social capital dimensions, whereas bridging connectivities affects only the cognitive social capital dimension. As bridging connectivities is also a significant contributor towards bonding connectivities, it should be further investigated to identify items/factors that strengthen bridging connectivities.

6.5. Managerial implications

The three social capital dimensions are the elements that together connect VW end-users. These elements are the key outcomes factors that influence the building of a higher level of relational trust amongst existing end-users within a particular VW community.

This, in turn, influences the further acquisition of new members, such as the word-of-mouth introductions to friends of end-users. This implies the continuous growth (sustainability) of a loyal community end-users and supports business continuity.

SEM allows the examination of direct and indirect effects through intermediary (moderator) constructs. The total effect of the model allows an explanation of these effects (Hagenaars, 1998). In the total effects column of Table 6.1, the friendship motive is identified as the most important motivator directly influencing bonding and indirectly delivering social capital. This suggests that when developers and/or businesses selectively move to develop new products they must first consider mechanisms (and measures) that build friendship, for example, those participating in Facebook communities. When considering the t-test results (Table 5.8) for friendship, managers can differentiate between EU and both SL and WOW. Thus, managers can select strategies for EU-type interactive gaming environments by enlisting the VW differences. However, managers cannot significantly differentiate between SL and WOW friendship motives.

Table 6.1: Social Capital Motives Model: Standardised Direct, Indirect and Total Effects

Exogenous (independent) Construct	Endogenous (dependent) Construct	Direct Effects	Indirect Effects	Total Effects	R^2
Bridging	Cognitive	0.136	0.066	0.202	0.09
Bonding		0.217	0.000	0.217	
Achievement		-	0.042	0.042	
Control		-	0.033	0.033	
Escapism		-	0.067	0.067	
Friendship		-	0.066	0.066	
Bridging	Relational	0.000	0.183	0.183	0.36
Bonding		0.185	0.256	0.441	
Achievement		-	0.038	0.038	
Control		-	0.068	0.068	
Escapism		-	0.093	0.093	
Friendship		-	0.135	0.135	
Cognitive	Structural	0.245	-	0.245	0.52
Structural		0.364	-	0.364	
Bridging		0.000	0.220	0.220	
Bonding		0.723	0.000	0.723	
Achievement		-	0.046	0.046	
Control		-	0.111	0.111	
Escapism		-	0.137	0.137	
Friendship		-	0.221	0.221	

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Table 6.1 shows the next most important motive to deliver social capital in virtual worlds: escapism. Further, the t-tests show that SL, EU and WOW end-users engage significantly in different forms of escapism. Hence, managers can selectively engage in specific (targeted) escapism tactics when seeking to maximise the social capital of end-users actively participating within their business' VW.

The third most important business motivator in the VW is control. Here, only SL can be t-test-differentiated from EU and WOW, which again offers managers strategic points-of-difference to grow the social capital within their SL-type VW.

The weakest motivator used in this study is achievement. Here, managers can only strategically t-test-differentiate WOW gaming environments against either the EU or SL environment.

In summary, Table 6.1 and the t-test results in Table 5.8 toTable *5.10* together display the four different motive constructs, with each offering a different level of motivation towards the deliverance of social capital for the end-users of a specific VW. These

constructs can be selectively tweaked to enhance one of the four specific VW environment types in Figure 1.1.

As Figure 5.2 demonstrates, bonding is the most important connectivities linkage when delivering social capital. Thus, managers should carefully consider how and when they enlist end-user bonding when creating their targeted motive strategies. The targeted combined effect of motives and bonding can be pushed towards delivering more social capital and ultimately delivering greater relational trust in the targeted VW.

Hamilton and Tee (2013) have shown that well targeted motives deliver value and, in turn, value delivers satisfaction, trust and loyalty. Thus, it is likely that when the social capital motives model delivers additional relational trust to the VW end-users, it is also likely to deliver additional satisfaction and further loyalty to the same VW end-users. This is another important consideration for mangers of VW-type environments when seeking to grow their targeted VW community (or communities).

Managers of VW environments that are similar to either SL, EU or WOW may recognise friendship as a key motive for end-user VW engagement. In this situation, they can enlist a social media approach, like Facebook, and build it into their VW environment. This should increase the friendship motive and, in turn, add to their resultant social capital and to their end-users' loyalty. This study's finding is now supported by Facebook's latest approach (Tucker, 2016).

Facebook is now trialling a gaming environment on its platform, and it is also offering a single login point into Facebook and into other VW environments (Grunewald, 2017). This is the new Facebook "friendship" approach to combine its appeal into VWs, and to drive additional "friendship" communities of end-users into its social networks.

Managers designing new or modified VW platforms should ensure they recognise that their targeted VW end-users form friendship communities, but actually participate for differing escapism motives. These motives can be determined and then specifically targeted, along with attempts to tackle the other motive drivers of control and achievement. Managers should also consider this study's t-test differences (Table 5.8 - Table 5.10) and then decide how their VW platform can be best engaged. For example, managers understanding the significant differences between the different VW

platforms can push different customised messages, including advertising (for example, Facebook's carousel advertising), towards targeted end-users.

This can be achieved by engaging end-users' VW locations (e.g. IP locations and virtual maps) and their VW behavioural activities and integrating these with the real-world environment. For example, American Apparel offers a 15% discount to anyone buying clothes in their SL virtual store instead of their physical store (Jana, 2006).

6.6. Empirical contribution

The social capital motives model (Figure 5.2) extends previous literature by elucidating that at least four motives of VW end-users drive the acquisition of social capital.

This study demonstrates that bridging and bonding represent a two-step, first-stage progression towards social capital attainment and, without either bridging or bonding, the VW motives engaged herein may not generate significant social capital. This study adds a new model pathway to the literature. It shows that bridging does significantly contribute towards bonding.

The three social capital dimensions represent the second stage in the deliverance of a VW social capital outcome. Again, this is also a two-step process, with cognitive and structural social capital feeding into relational social capital.

Finally, the social capital motives model (Figure 5.2) is a bootstrap-validated, causal model consisting of a two-stage and two x two-step model. Its 12 significant causal paths support 12 literature-developed hypotheses. Across any one pathway (from its input motive construct through to its output relational social capital construct) there exists a maximum of four (and a minimum of two) significant sequential causal paths. Thus, the model's maximum path length remains suitable for analysis using a SEM pathways model approach (Cunningham, 2008; Hair et al., 2010).

6.7. Limitations of research

This study examines end-user motives and the generation of social capital in VWs. The study's limitations are as follow.

The choice of one major VW platform per VW type (Figure 1.1). This study chose one VW to represent a VW type/category; for example, SL represents SVWs, EU represents MVWs and WOW represents GVWs. Further study can be conducted to generalise this study's findings of one VW platform as representative of the entire VW type.

The sample size per VW type is relatively small and larger sample sizes per VW may allow more in-depth analysis and interpretation.

The developed online survey was written in English and, therefore, limited the potential respondent pool to English-speaking end-users. A multilingual survey may contribute to this study's findings.

This study did not consider the demographics (age, gender, social status and educational level) or the background differences of the end-users and their effects on active end-user motives. Further segmentation may provide further insights.

The bridging construct shows a low loading, which indicates that the item measures can be refined.

This study engages the four widely used literature supported motives when investigating VWs end-users, but other VW end-user motives may exist (refer to Table 2.1, Chapter 2).

6.8. Future research

The social capital motives model (Figure 5.2) extends previous literature by elucidating that at least four motives of VW end-users combine to drive the acquisition of social capital via the establishment of social connectivities. This study finds that active end-user motives within a social online VW platform remain an understudied area within the academic literature. More specifically, this study theoretically builds and tests some new VW construct combinations and offers them as a foundation for future VW research.

Contextually, and beyond this study, this research envisages the three VWs studied to be representative of the three online quadrants of Figure 1.1. Future research can retest (and seek to validate) this study against different VWs and different VW platform types within Figure 1.1, such as There.com and OpenSim instead of SL, Galaxy on Fire and PlaneShift instead of EU and EverQuest instead WOW. Other platforms, such as Facebook, Instagram, Snapchat and Twitter, can also be added for consideration.

Beyond this study, future research can qualitatively investigate whether other VW end-user motives may apply such as entertainment, ease-of-use/usefulness, meditation and/or excitement.

The social capital measured thus far by VW researchers and integrated into three social capital dimensions in this study should likely include the additional constructs of satisfaction and loyalty, possibly in line with Hamilton and Tee's value dimensions studies (Hamilton & Tee, 2013, 2015).

The social connectivities intermediaries (bridging and bonding) that enable the subsequent generation of social capital can be investigated in-depth to test whether bridging connectivities can be push-promoted into bonding connectivities. In addition, there may be a cut-off point for switching from bridging to bonding connectivities.

The bridging and bonding constructs may also be investigated as behavioural value deliverance constructs. Future research can consider social connectivities as five value-delivering constructs (Hamilton & Tee, 2013, 2015), which, in turn, deliver social capital dimensions.

This study utilises English language respondents. Ideally, a larger sample size and the engagement of other key languages are desirable to broaden understanding around subsets of VW respondents and to provide more generalisable findings.

This allows the pursuit of more detailed segmentation among active end-users of each VW. Further segmentation of a larger sample may also be possible for gender, age education level, region/location and language groupings, and/or for non-, low-, medium- or high-active end-user groups.

The virtual economy (v-economy) and real money trading (RMT) are generating billions of dollars across VWs (BBC News, 2015; Engage Digital Media, 2010; Lehdonvirta, 2009; MindArk, 2012; PR Newswire, 2014; Tassi, 2014). This study's behavioural approach (and the above considerations) can be engaged to classify active end-users of a VW by their RMT activities, either as VW real money traders or VW non-real money traders.

This study can be extended to enable managers to better understand behaviours of active end-users and their RMT activities within their relevant v-economy.

6.9. Chapter summary

This study answers the main research question—"How do end-user motives influence social capital dimensions in a Virtual World?"—and its four sub-questions. It develops a conceptual research framework with hypothesised paths between constructs. It delivers an online survey and analyses and validates respondent data via SEM and t-test measurements. The resultant social capital motives model aligns with gratification, social relationship and social capital theoretical aspects. It delivers management solutions and it provides additional theoretical and empirical knowledge.

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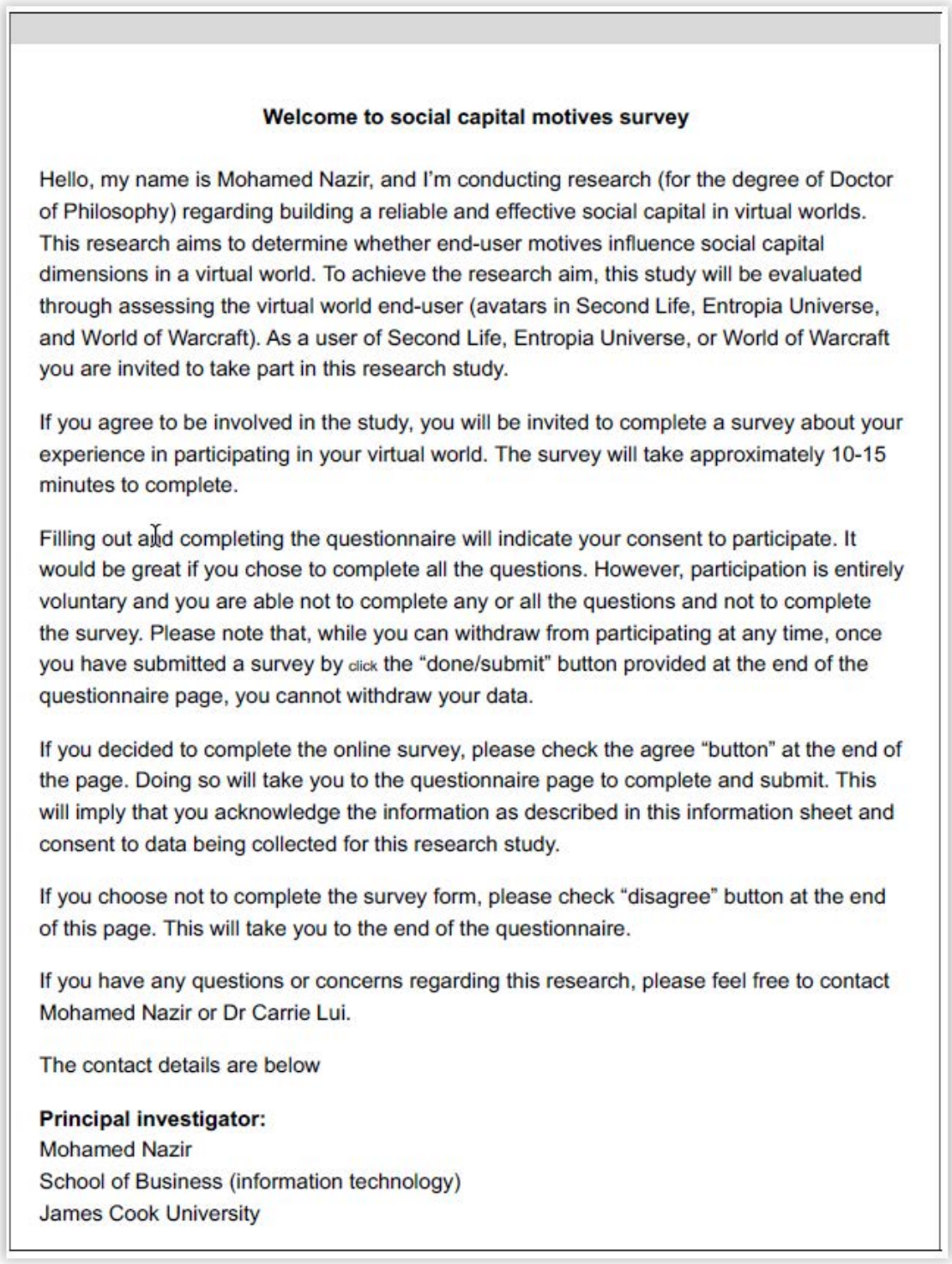
APPENDIX 1

Online survey export snapshot



Welcome to social capital motives survey

Hello, my name is Mohamed Nazir, and I'm conducting research (for the degree of Doctor of Philosophy) regarding building a reliable and effective social capital in virtual worlds. This research aims to determine whether end-user motives influence social capital dimensions in a virtual world. To achieve the research aim, this study will be evaluated through assessing the virtual world end-user (avatars in Second Life, Entropia Universe, and World of Warcraft). As a user of Second Life, Entropia Universe, or World of Warcraft you are invited to take part in this research study.

If you agree to be involved in the study, you will be invited to complete a survey about your experience in participating in your virtual world. The survey will take approximately 10-15 minutes to complete.

Filling out and completing the questionnaire will indicate your consent to participate. It would be great if you chose to complete all the questions. However, participation is entirely voluntary and you are able not to complete any or all the questions and not to complete the survey. Please note that, while you can withdraw from participating at any time, once you have submitted a survey by click the "done/submit" button provided at the end of the questionnaire page, you cannot withdraw your data.

If you decided to complete the online survey, please check the agree "button" at the end of the page. Doing so will take you to the questionnaire page to complete and submit. This will imply that you acknowledge the information as described in this information sheet and consent to data being collected for this research study.

If you choose not to complete the survey form, please check "disagree" button at the end of this page. This will take you to the end of the questionnaire.

If you have any questions or concerns regarding this research, please feel free to contact Mohamed Nazir or Dr Carrie Lui.

The contact details are below

Principal investigator:
Mohamed Nazir
School of Business (information technology)
James Cook University

Email: Mohamed.Mohamed@my.jcu.edu.au

Supervisor:
Dr Carrie Lui
School of Business (information technology)
James Cook University
Email: Carrie.Lui@jcu.edu.au

* 1. Do you agree to disagree to participate in this survey?

- ◯ Agree
- ◯ Disagree

2. Which one of the following virtual worlds have you used/played before

- [ ] Second Life
- [ ] Entropia Universe
- [ ] World of Warcraft
- [ ] The Sims
- [ ] IMVU
- [ ] Blue Mars
- [ ] Utherverse
- [ ] Active Worlds

3. Which one of the following virtual worlds do you use mostly

- ◯ Second Life
- ◯ Entropia Universe
- ◯ World of Warcraft

4. What is your gender?

- ◯ Female
- ◯ Male

5. What is your age?

- ◯ 18 to 24
- ◯ 25 to 34
- ◯ 35 to 44
- ◯ 45 to 54
- ◯ 55 or older

6. What is your highest education level?

- ◯ High school
- ◯ Community college
- ◯ Undergraduate
- ◯ Graduate

7. Which region are you from?

- ◯ North America
- ◯ South America
- ◯ Asia
- ◯ Europe
- ◯ Africa
- ◯ Oceania
- ◯ Middle East
- ◯ Other (please specify)

8. What is your salary range per year?

- ◯ Less than US$30,000
- ◯ US$30,000 to US$39.999
- ◯ US$40,000 to US$49,999
- ◯ US$50,000 to US$59,999
- ◯ US$60,000 to US$74,999
- ◯ US$75,000 to US$99,999
- ◯ US$100,000 or more
- ◯ Other (please specify)

9. How often do your login to your virtual world?

- ◯ Less than once a year
- ◯ Once a month
- ◯ Once a week
- ◯ Several times a week
- ◯ Daily

10. In VW, I:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
feel pleasure running a successful business	○	○	○	○	○
am very satisfied owning my own business	○	○	○	○	○
have built one of the best creations	○	○	○	○	○
enjoy building and creating things	○	○	○	○	○
try to earn as much (virtual) money as possible	○	○	○	○	○

11. In the VW, it is important that:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
my character (avatar) has uniqueness	○	○	○	○	○
my character (avatar) looks fashionable	○	○	○	○	○
I have some personalised virtual items	○	○	○	○	○
my character (avatar) looks different from others	○	○	○	○	○

12. In the VW, I:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
like to escape the real world	○	○	○	○	○
can forget some real-life problems	○	○	○	○	○
can relieve my daily stress	○	○	○	○	○
can relax from my real-life reasonability	○	○	○	○	○
wish to have my avatar in real life	○	○	○	○	○
feel freedom in my relationships with others	○	○	○	○	○

13. In the VW, I:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
find it easier to start a conversation with strangers	○	○	○	○	○
talk more about personal issues with my virtual friends	○	○	○	○	○
can remove some of my self-restraints	○	○	○	○	○
have a different personality than in real life	○	○	○	○	○

14. In the VW, I like:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
to help others in the VW	○	○	○	○	○
not to share knowledge with others	○	○	○	○	○
breaking rules	○	○	○	○	○
volunteer my time to the communities	○	○	○	○	○
to donate rewards to help others.	○	○	○	○	○

15. In the VW, I find it easier to:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
start a conversation with strangers than in real-life	○	○	○	○	○
have good friends	○	○	○	○	○
talk more about personal issues with VW friends than in real life	○	○	○	○	○
remove some of my self-restraints	○	○	○	○	○
have a lot of friends	○	○	○	○	○

16. In the VW, community users:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
uses common terms and jargons	○	○	○	○	○
uses understandable communication patterns during discussions	○	○	○	○	○
uses understandable narrative forms to post messages	○	○	○	○	○
share the same vision of helping and solving problems for others	○	○	○	○	○
share the same goals of learning from each other	○	○	○	○	○
share the same values of pleasure from helping others	○	○	○	○	○

17. In the VW, I:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
know others will help me, so it is fair to help them	○	○	○	○	○
know others will help me if I need assistance	○	○	○	○	○
belong to the community	○	○	○	○	○
am close and together with the community	○	○	○	○	○
am positive towards the community	○	○	○	○	○
am proud to be member of the community	○	○	○	○	○

18. In the VW, I:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
maintain close relationship with others	○	○	○	○	○
spend a lot of time interacting with others	○	○	○	○	○
know some members on a personal level	○	○	○	○	○
frequently communicate with others in the community	○	○	○	○	○

19. Please provide your user name or account name for verification purpose.

20. If you have any comment/s, request/s, and/or question/s, please type it here