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‘Innovation within Innovation’

A Study of twenty innovative global firms diffusing
Virtual Reality (VR) with existing E-Commerce (EC) business models
within online digital world SECONDLIFE (SL)

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ABSTRACT

This qualitative research will draw upon the Diffusions of Innovation Theory construct, ‘Five Innovation Adoption Categories’, to examine if Category One ‘Innovators’ actually ‘innovate’ at different technology immersion levels that can be more accurately categorised around low, medium or high levels of innovation diffusion. This will be achieved by analysing the pioneering commercial behaviour of twenty innovative firms experimenting and linking their E-Commerce (EC) business models into the Virtual Reality (VR) setting of popular online digital world Secondlife (SL). Both EC and VR literature is combined to create a unique data collection framework to test for differing innovation immersion levels, where findings are expected to form the foundations for hybrid EC/VR business models for diffusion throughout Innovation Adoption Categories Two to Five. A unique content analysis approach will be undertaken by adopting a virtual ‘avatar’ identity to collect the data within the VR setting. Findings from this research are expected to contribute a greater understanding of how the increasing complexities of technology are presenting a diverse range of innovative commercial pathways, which have significant implications for future marketing applications.

Research Overview

Diffusions of Innovations Theory (Rogers 1962-2003) is a widely acknowledged academic theory base that has been applied across a broad range of research disciplines. As its name signifies, this theory provides many key constructs for examining the adoption and diffusion behaviour of innovation by entities, and is widely drawn upon for researching the adoption of new technologies, contributing significantly to its ongoing theoretical development. In particular, Diffusions of Innovations Theory (Rogers 1962-2003) is well recognised for its five 'innovation adoption categories'; category one 'innovators', category two 'early adopters', category three 'early majority', category four 'late majority', and category five 'laggards'. These five categories provide an essential categorisation unit of analysis for measuring innovation uptake, however with the advent of technological innovations increasing in complexity and multiple capabilities, the first category of 'innovators' fails to account for the varying and diverse levels of innovation adoption and diffusion taking place within this first category alone (in terms of business applications). Essentially, 'innovators' are now innovating with new technologies in a variety of different ways that can be further categorised around low, medium, or high levels of innovation diffusion (within the innovation). This research aims to examine these deeper levels of 'innovation within innovation' and test whether the experimental activities of existing innovation adoption category one 'innovators' do actually reflect these differing levels of diffusion categorisation (i.e. low, medium, or high). In order to achieve this, this research will investigate twenty 'innovator' firms experimenting with Virtual Reality (VR) technology within the rich innovative environment of online virtual world Secondlife (SL), to examine their depth of innovation diffusion within the innovation of VR itself. More specifically, this depth will be measured by the amount of interplay between their existing E-Commerce (EC) business models and the adoption of the relative advantages offered by VR, to create new and improved EC/VR business models. Key EC and VR literature has been synthesised to provide a unique data collection framework as a starting point for analysing firms EC/VR business model interplay, and to test for low, medium or high levels of EC/VR diffusion, however a flexible approach will be taken at all times to incorporate other innovative activities that may differ from this framework. (This analysis framework is considered a contribution to research in itself. See Appendix B – Data Collection Framework). In addition to contributing to a deeper understanding of Diffusions of Innovations Theory (Rogers 1962-2003) innovation adoption category one 'innovators', findings from this research will aim to identify potential EC/VR business models for broader business application by innovation adoption categories two (early adopters), three (early majority), four (late majority) and five (laggards). (See Appendix A – Research Design).

Following this overview, the format of this research paper will address VR as the innovation to be examined, present SL as the setting providing the means to examine the innovation, and identify further components of Diffusions of Innovations Theory (Rogers 1962-2003) combined with key constructs from the EC and VR literature, to provide the data collection framework for examining the research questions. This will be followed by further clarification of the research gaps, the research questions, methodology, data analysis, and conclude with ethical considerations.

Background to VR as the innovation

The Internet as we've known it is undergoing a second evolutionary wave referred to as Generation Web 2.0 (O'Reilly 2005). Largely driven by the advent of newly evolving technology infrastructures including server-software, messaging-protocols, content-syndication, standards-based browsers with plug-ins and extensions, and numerous client-applications, these complex additions to the original Internet platforms are providing a new generation of tech-savvy consumers the means to engage in user generated information creation, storage, and dissemination, unparalleled in our recent history (O'Reilly 2005). Previously a tool largely driven by professional and commercial interests, the internet is now facilitating a new means for social networking, collaboration, and data file sharing that is empowering consumers to

explore the Internet as a peer to peer global communication resource (e.g. MySpace, YouTube and FaceBook). Included in this Web 2.0 phenomena are new 3D technologies providing sophisticated virtual environments referred to as Multi User Virtual Environments (MUVE's), for consumers to meet in cyberspace as a means for virtual socializing, engaging in virtual leisure activities, creating virtual objects, and for just plain old virtual 'hanging out' (e.g. There, SimsOnline, World of Warcraft and Secondlife), (Patel and Cardinali 1994). VR is essentially a computer-generated reality, also referred to as cyberspace, virtual environment, simulations, and artificial worlds (Patel and Cardinali 1994). Users can immerse themselves in this digitized world and experience the sense of flying, jumping and walking through structures, as well as co-creating almost virtually anything (Patel and Cardinali 1994). So popular are these MUVE's, that Gartner Inc (2007) claims that 80% of active internet users (including Fortune 500 companies) will be interacting within online VR worlds by the end of year 2011. This colossal prediction has huge ramifications for conducting business online in the coming years, given active Internet users are expected to reach 1.8 billion by 2010 (Computer Industry Almanac 2007). According to Patel and Cardinali (1994) such technology has enormous potential for every form of business imaginable, including education, health, military, government, and entertainment. It is therefore no surprise to see innovative firms seeking any opportunity to explore and experiment with VR capabilities in terms of potential business applications. However, it has been the unique 'anything goes' virtual environment of online virtual world Secondlife (SL) that has captured the attention of adventuresome large innovative brands, as it is providing an effective embryonic laboratory for evolving new virtual electronic business applications (along with many other social experimental applications which are not the subject of this research). The experimental activities of these pioneering firms within SL include the integration of existing E-Commerce (EC) business models into the VR setting, providing important groundwork for the development of new hybrid internet EC/VR business models. Using an empirical approach, described by Punch (2006) as 'direct experience or observation of the world, p.3', this research will examine how twenty innovative firms are experimenting with VR technology within online virtual world SL, to extend and improve their existing EC business models. This will enable the identification of different levels of innovation diffusion occurring within the 'innovator' category, whilst reflecting a variety of potential EC/VR business models for broader business category adoption.

As a point of clarification, this research concentrates on 'PC desktop' systems that use a keyboard and mouse interface accessible by any regular Internet user, rather than the more complicated 'fully immersive' systems that use head-mounted displays and other peripheral devices to provide an illusion of object manipulation within the virtual setting (Watts and Swann 1998).

Setting - The rise of www.secondlife.com

SL is an online 3D digital world, 'imagined, created and owned by its residents (Secondlife 2007)', mastermind by entrepreneurial guru Philip Rosedale of Linden Lab in 2003. Recently ranked amongst the top 100 influential people in the world under the category of 'Builders and Titans' by Time Magazine 2007 (The Courier Mail 2007), Rosedale enjoys the impressive support of major financial investors Jeffrey Bezos (founder of Amazon), Pierre Omidyar (founder of eBay), and Mitchell Kapor (software pioneer and philanthropist), (Siklos 2006). Boasting a large and rapidly increasing number of participants, SL hosts over eight million registered residents, with large numbers communicating and creating within the one shared setting at any one time. Due to the outstanding successful uptake and the exotic interactive visual offerings, SL is being explored by a plethora of innovators, including cutting-edge IT, communication, and corporate marketing firms, as well as leading educational organisations (including QUT Creative), (Siklos 2006). The sample for this research have been purposively selected from this previously highlighted pool of innovators by media journal articles, however they have been narrowed down to well-recognised global firms only (not educational organisations), reflecting the business focus of this research.

Theoretical framework

In addition to the innovation adoption categories outlined previously in the proposal overview, this research will draw upon other key components of Diffusion of Innovations Theory (Rogers 1962-2003) to support the research enquiry framework for examining the adoption and diffusion of VR by firms with existing EC business models. Firstly, the theory will provide a definition of innovation as ‘an idea, practice, or object perceived as new by an individual or other unit of adoption (Rogers 2003, p36)’, and explain the characteristic of innovation as ‘the degree to which an innovation is perceived as better than the idea it supersedes (Rogers 2003, p15)’. Secondly, two key constructs will underpin the research parameters; a construct being described by Cavana et al (2001) as an abstract representation of phenomena to be investigated as a theory. The first construct has resulted from prior technology research, contributing the construct of ‘technology clusters’ to Diffusions of Innovations Theory (Rogers 2003), which ‘consists of one or more distinguishable elements of technology that are perceived as being closely interrelated (Rogers 2003, p14)’ where boundaries between elements are unclear, and where it is difficult to determine where an innovation stops and another begins. The second key construct is the notion of ‘reinvention’, described by Rogers (2003) as ‘the degree to which an innovation is changed or modified by a user in the process of adoption and implementation (Rogers 2003, p17)’ and where ‘many adopters want to participate actively in customizing an innovation to fit their unique situation (Rogers 2003, p17)’. Both these important constructs provide the theoretical framework to support the conceptualisation of innovation occurring within the innovation, where different levels of ‘reinvention’ are taking place within an overlapping ‘technology cluster’, resulting in the interlinking and diffusion of a variety of EC/VR business models.

Returning to the innovation adoption categories provided by Diffusion of Innovations Theory (Rogers 1962-2003), the sample for this research are all adoption category one ‘innovators’ (as previously outlined), which are characterized as wealthy, large, well educated, and with high social status (Rogers 2003). Due to their inventive nature, this sample is expected to reflect different degrees of VR diffusion and reinvention within the technology cluster, thus providing an appropriate research environment for examining and testing for different levels of ‘innovation within the innovation’, and their potential ramifications for new EC/VR business models.

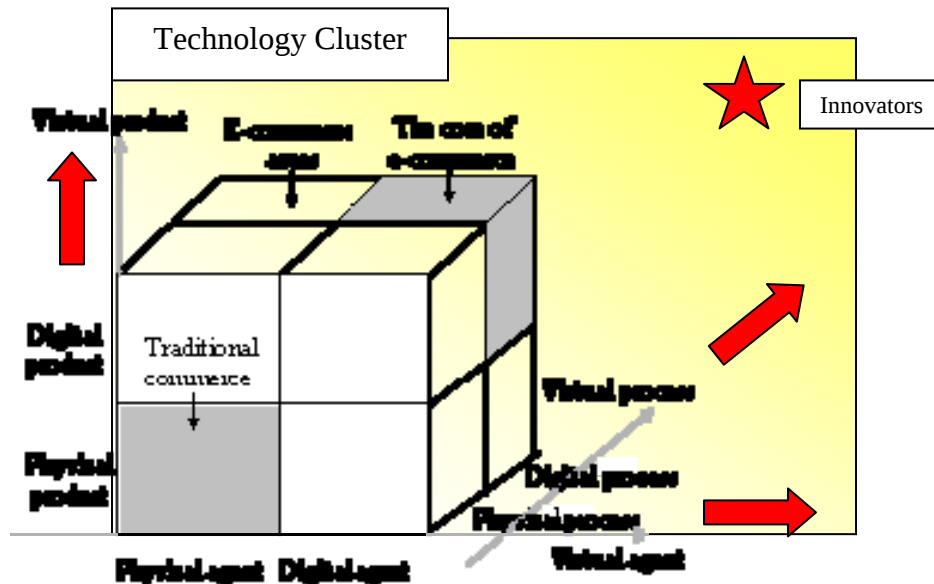
EC/VR Literature

VR technologies have much to offer for significantly enhancing existing EC capabilities. Whilst EC uses Hypertext Mark Up Language (HTML) to facilitate the ‘process of buying, selling, or exchanging products, services, and information via computer networks (Turban and King 2003, p3)’, VR involves the additional technologies of Virtual Reality Modeling Language (VRML) and QuickTime Virtual Reality (QTVR) that uses the ‘non-immersive 2D display to give the user the visual impression of moving through a 3D space in real time (Howes et al, 2001, p239)’, as experienced in video games. However, this research will specifically focus on the business application of these technologies (not the technologies themselves) and draws upon both current EC and VR literature to examine the five key business issues pertaining to EC, and the potential relative advantages offered by VR in relation to these key issues. Furthermore, the relationships between these five business issues across both EC and VR form the foundation for the research data collection framework, and final data analysis, in order to examine, measure, and test for the various levels of ‘innovation within the innovation’. (See appendix A. Research Design).

To begin with, Choi et al (1997) provide a foundation framework showing the increasingly digital dimensions of commerce whilst identifying ‘product, process and agent’ as the key directional drivers (see Diagram 1.). ‘Virtual product, virtual process, and virtual agent’ are all highlighted with arrows indicating their natural extension beyond the traditional EC model. Accordingly, this model has been adapted to highlight the Diffusion of Innovations Theory construct ‘technology cluster’ (outer square) as

outlined by Rogers (2003), to signify the wider area of interest pertaining to this research, which presents a logical opportunity to extend this existing 'Dimensions of EC' model to include 'Dimensions of EC/VR', as a possible next-step research direction based on findings presented from this research proposal.

Diagram 1. Dimensions of EC



Adapted from 'Dimensions of E Commerce Model'
Source: Choi, Stahl and Whinston (1997, p. 18)

Incorporating product, process and agent as key dimensions of EC (Choi et al, 1997), general EC literature outlines five key issues pertaining to successful EC.

Key issue 1 (KI1)	Establishing trust where no face-to-face agents
Key issue 2 (KI2)	Compensating for lack of real world presence
Key issue 3 (KI3)	Fostering interactivity
Key issue 4 (KI4)	Creating allure
Key issue 5 (KI5)	Providing flow

Papadopoulou et al (2001) state that trust (KI1) is a major challenge for successful EC where a 2D computer interface is limited to providing quality customer service compared with face-to-face agents. Limitations also exist with the lack of physical shop presence (KI2) where products can only be displayed in a 2D format, and where placement, and view of product ranges are severely restricted (Li et al 2001; Howes et al 2001; Shih 1998). Interactivity (KI3) is also identified as the key to 'stickiness' (customer loyalty to a website), providing customer engagement which leads to website satisfaction (Gammack & Hodgkinson 2003, Shih 1998). However attracting new customers (KI4) in the first place, as well as retaining existing ones, provides the ongoing challenge of allure (Sager 2002), particularly in light of overwhelming online global competition and vast arrays of choice. Furthermore, providing flow (KI5) for EC customers amid business objectives is an ongoing challenge for EC, and is described by Hoffman and Novak (1996) as the degree of enjoyable immersion experienced by the internet user during site

navigation, where self consciousness is overtaken by an intense self-gratifying sense of play and where nothing else seems to matter (Csikszentmihalyi 1990).

According to VR literature, there are many ‘relative advantages’ provided by VR, which offer potential remedies to the five limitations related to EC issues. These five relative advantages include;

Relative advantage 1 (RA1)	The ability to provide e-servicescapes using virtual agents
Relative advantage 2 (RA2)	The use of telepresence to enhance product display
Relative advantage 3 (RA3)	The fostering of bricolage to engage high levels of interactivity
Relative advantage 4 (RA4)	VR provides an established community within a unique cyber-cultural setting
Relative advantage 5 (RA5)	VR allows for sophisticated design capabilities to enhance the sense of flow

E-servicescapes (RA1) were conceptualised by Papadopoulou et al (2001) and include the means for incorporating virtual agents to meet and greet customers (Howes et al 2001), thus providing a sense of customer service closer to a physical shop experience. However, virtual agents interact with ‘shadow customers’ in the form of their avatars (self created alter-egos) that may act differently to the real self behind the projected facade, where it is suggested that the avatar persona may in fact influence the purchasing behaviour of the consumer (Hemp 2006). This suggests that firms using virtual agents must learn how to service the avatar identity itself, as well as its real life counterpart, making for an interesting dual psychological challenge for marketing pioneers, particularly when the aim is to gain consumer (and avatar) trust. Furthermore, virtual agents provide the opportunity for brands to sustain engagement with avatars (and their shadow consumers) as apposed to a brief click-through purchase or product information data retrieval, traditionally a major goal for online marketers (Hemp 2006). E-servicescapes also provide the ability to target avatar ‘segments’, and to collect consumer virtual behaviour information that is instantly recordable and instantly able to be tailored, such as the ability to mimic consumer body language and expressions, a sales technique commonly adopted in real world customer relations (Hemp 2006).

Telepresence (RA2) is defined by Schloerb (1995) as the perception of a physical presence within a computer mediated environment, as facilitated by direct interactivity and increased vividness. Vividness is described as the extent that technology provides environmental sensory cues that mirror reality (Shih 1998). Both telepresence and Vividness enhance the ability to display products in a 3D natural setting, and allows for customers to view multiple product offerings in their periphery vision akin to real store product exposure (Li et al 2001; Howes et al 2001; and Steuer 1992).

Bricolage (RA3) is described as a self-learning tinkering process that manipulates existing resources to build and create new ideas (Turtle 1995). Furthermore, it enhances the cognitive learning process that fosters creative and original inventions (Shih 1998). VR, with its advanced interactive capabilities offers a sophisticated means for engaging interactivity and fostering bricolage, which in turn may provide unique offerings and design solutions for real life business applications. For example, Coke launched a competition in SL for customers to design a virtual coke vending machine to ‘fulfill virtual wishes’ for real life vending machines users (Centaur Communications 2007). This was a clever initiative by Coke, for not only did they draw upon the talent of VR consumers to provide their own design solutions, but it also reflects that Coke acknowledged (and fitted into) the unique community and culture (RA4) of SL. This virtual culture incorporates its own language, currency and ethical values, and raises the question of how far are powerful ‘mega brands’ willing to experiment to gain acceptance in this new culturally

sensitive VR environment? This is a particularly important question as Castronova (2005) states that brands must fit into the 'fantasy' world and not wreck the fantasy, as 'the fantasy is why people visit synthetic worlds in the first place (Castronova 2005, p.2)'. Furthermore, real-world brands need to reconsider purely commercial encroachment of virtual worlds where consumers ultimately seek to escape from reality, and their marketing efforts need to compliment the virtual environment and contribute to the participants experience (Hemp 2006). In order to examine this area of enquiry, this research introduces the new concept of 'VR community ethic' to measure how businesses 'fit' into the SL culture, and attempt to create a meaningful and relative 'hotspot' in its efforts to allure customers.

Finally, all these relative advantages combined with the new design capabilities of VR technologies in general greatly enhance the capacity to provide the experience of flow (RA5) for the consumer (Sager 2002). Flow is said to be a 'cognitive state experienced during navigation that is determined by (1) high levels of skill and control; (2) high levels of challenge and arousal; (3) focused attention; and (4) is enhanced by interactivity and telepresence (Novak, Hoffman and Yung 2000, p.22)'. All of these properties are greatly enhanced with the VR navigational experience where the consumer is more likely to identify a brand in a more positive light where high levels of flow are facilitated (Hoffman and Novak 2001).

Research Gap

Not surprisingly, academic literature on SL is in its infancy, however this is expected to change over the next twelve months according to Mandy Salomon of Smart Internet Technology CRC (2007), who identifies a wide variety of potential research areas in her investigative article 'Business in Second Life: an introduction'. Furthermore, existing VR literature focuses mainly on technology (Li et al 2001) where 'the manner in which VR Technology may be employed to support specific business processes . . . has gone largely unexplored (Sager 2002, p.3)'. This research is expected to be amid some of the first academic research papers on SL, and among the first to examine the business applications of VR in relation to existing EC business models. Furthermore, this research aims to contribute the new construct of 'innovators within innovators' to the Innovation Adoption Theory (Rogers 1962-2003), adoption category one 'innovators', if this is in fact found to be accurate. This will be achieved by combining EC/VR literature to create a new research framework for exploring how the relative advantages of VR are being diffused with existing EC business models within the unique VR SL community. Within this framework, the new concept of VR community ethic is also introduced, as it relates directly to businesses operating within the SECONDLIFE community.

Research Questions

The above contributions will be achieved by examining the overarching research question 'at what levels are innovator firms diffusing the relative advantages of VR technology into their existing EC business models?' To answer this, five specific sub questions will be researched incorporating the EC key issues (and VR relative advantages) from the EC/VR literature as previously outlined (See Appendix B. Data Collection Framework).

	SPECIFIC RESEARCH SUB QUESTIONS
1	Are VR business models providing e-servicescapes by using virtual agents (RA1) , and if so, to what degree?
2	Where are the sample firms located within SL, and how are they using telepresence (RA2) to display company, brand and products?
3	To what degrees are the sample firms fostering real time interactivity (bricolage) (RA3) ?
4	What degrees of innovation/risk and fit, are sample firms undertaking to allure SL community members to brand (RA4) ?
5	How are the sample firms using the new technology design capabilities to provide flow (RA5) ?

Significance of Research

This research aims to contribute to Diffusions of Innovation Theory (Rogers 1962-2003) and to EC/VR business literature, by applying a new research framework to examine how the relative advantages of VR are being diffused with existing EC business models by innovator firms in SL. Findings from this research aim to identify if there are actually different levels of innovation diffusion occurring within an innovation, by adoption category one ‘innovators’, and if so, may help to better understand the enormous scope that new innovations offer for a variety of possible business applications. This is important in an increasingly technical and complex business environment where ‘all eyes’ are on the forerunners who carve out the cutting edge potentialities of new frontiers for the benefit of all that follow. In VR realms so far, ‘no size fits all’, and ‘anything seems to go’. But most importantly, big brands (in this case the ‘innovators’) have the financial means and desire to ‘stake their claims early’, and in so doing pave the foundations for a variety of hybrid EC/VR business models for potential future adoption by categories two ‘early adopters’, three ‘early majority’, four ‘late majority’, and five ‘laggards’ (Rogers 1962-2003). If Gartner Inc’s claim is anything to go by (by the end of 2011, 80% of active internet users will be interacting within online VR worlds), the identification of early EC/VR business models will be a highly valuable contribution to general business marketing literature indeed.

Methodology

This research will undertake content analysis of online digital world SL by becoming a research ‘Avatar’ (named ‘Honour Miles’), to immerse in the online community and examine VR activities of twenty innovator firms. The purposive sampling technique of judgment sampling was used to select twenty innovative (adoption #1 category) high profile ‘real world’ companies as identified in media articles and television documentaries, which represent a variety of industries demonstrating different experimental approaches. Twenty firms are considered to be sufficient for gaining the qualitative information required to answer the research questions, and are an appropriate sample size given the time constraints of an honours research project. The ‘search’ capabilities of SL will be used to locate and ‘teleport’ directly to the activities of the twenty firms, where field observation of their VR presence, along with interaction between their EC/VR sites will be undertaken. Information will be collected as outlined in the data collection framework (see appendix B.) in order to address the five research enquiry areas, and finally answer the main research question, however an open and flexible approach will be taken at all during the analysis to include broader innovative activities not previously identified. The direct ‘search’ capability of SL will be used to locate the VR activities of the sample, which will save time and minimize ‘going native’ distractions where one loses all sense of objectivity (Koch 2006; Baxter and Eyles 1997), important in such a new and enticing imaginative interactive playground, where an objective (yet reflexive enough to ensure objectivity) approach is

paramount. Furthermore, to ensure the reliability and accuracy of all findings, the 'postcard' snapshot capability of SL will be used to provide a hard copy record of all findings, and will be used to obtain further peer validation.

Data Analysis

The data collection framework (Appendix B.) will be used to group and code all findings within 'low', 'medium', and 'high' categories of VR diffusion. It is proposed that colour may be used to rate the data according to the level of innovation diffusion against the colour continuum bar across the bottom of the data collection framework (see Appendix B). For example, if some data is found to be bridging between medium and high, the colour in between these ranges will be used to identify the diffusion blend. This is a unique approach to coding data, and has been selected due to its closer relationship with the continuous concept of diffusion, as opposed to the discrete measurement of numbers or letters. This coding will have significant relevance to the overall summary of findings, which will be presented around five categories, i.e. low, low-medium, medium, medium-high, and high levels of innovation diffusion. However, only three categories are initially defined for question clarification.

Findings will then be further grouped and categorised using Nudist software program, and interpreted in relation to the levels of 'innovation within innovation'. These new categories of 'innovation within innovation' will then form the basis for potential new EC/VR Business Models, which will be formally presented in a visual model format.

This research proposal acknowledges various limitations including, generalisability of the findings to alternative VR community settings, the potential for 'going native' in the new alluring virtual playground, the high level of technology requirements for SL access and operation, and the steep participant learning curve required to enter and participate in SL.

Ethical Considerations

Subject to ethical clearance from the QUT Institutional Ethics Committee, this research presents a unique qualitative research approach by adopting a 3D graphical representation (avatar) of the researcher to enter the SL community online virtual world, in order to navigate the site in real time and study the research sample. It is expected that other SL participant 'avatars' may independently approach the researcher, including 'agents' employed by the sample firms. In acknowledgement of the human behind the 'avatar', the researcher will introduce herself as a research student of QUT University at all times (via text chat), and communicate the general aims of the project before soliciting any information in order to avoid any covert deceptive research practices. To keep interactions simple, the researcher will ask to be shown around the firm by the 'agent', where all behavioural functions of the customer service levels will be recorded, not details of any interpersonal communication. Informed consent will be obtained from any 'agents' wishing to freely and voluntarily disclose any information beyond the obvious 'meet and greet' function, where they have the right to withdraw at any time, and where all interactions will be professional, respectful, honest, and focused on the research enquiry areas specified in the data collection framework only. 'Agents' names will be kept confidential at all times, and in the spirit of debriefing participants, contact details of the researcher will be made available to interested participants for follow up contact.

Beyond the uncharted issue of virtual interaction, this research does not expect to inflict any harm or risk upon others, nor create a conflict of interest. This is due to the relatively benign descriptive nature of the research occurring in an online public domain, gathering information of firms activities only, and with only minimum human interaction (apart from agents). However, all efforts will be undertaken to ensure

the objectivity and accuracy of the data collected and interpreted, as well as ensure academic honesty and integrity by avoiding plagiarism or intellectual discrimination in any shape or form.

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Appendices

Appendix A. Research Design

Appendix B. Data Collection Framework