

5-2-2012

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Elbanna, Amany, "MAKING BUSINESS SENSE OF AMBIGUOUS TECHNOLOGY: THE CASE OF SECOND LIFE" (2012).
ECIS 2012 Proceedings. 52.
<http://aisel.aisnet.org/ecis2012/52>

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MAKING BUSINESS SENSE OF AMBIGUOUS TECHNOLOGY: THE CASE OF SECOND LIFE

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Abstract

Second Life (SL) presents a case of extreme open flexible technology. It provides a generic 3D immersive environment with a range of technological capability including text, voice, build, and mobility. The technology and its providers do not prescribe a particular objective of use or value for users. Hence it is surrounded by ambiguity regarding the process of adoption and its value particularly for business organisations. This study explores the process of making business sense of Second Life and the resulting business value. It does so through examining the case of Mobile Office adoption of SL and the created business value. Applying the cognitive and interpretive concept of enactment as developed by Weick and colleagues, the findings show that SL adoption presents a process of enactment that involves humans and artefacts inside and outside the organisation. This process of enactment results in an emerging chain of innovation. Business value is then created in and through the enactment process. The contribution to theory and practice is then discussed.

Key words: Technology adoption, Value Creation, Ambiguous Technology, Second Life

1 INTRODUCTION

A virtual world (VW) is a 3D computer-based simulated environment over the Internet. It offers an immersive experience that provides users with realistic simulations of reality, advanced text-based chat and voice capabilities, and tools to design objects and surroundings. Users navigate and move around the VW represented by Avatars. Second Life (SL) is one of the prominent VWs. The number of its unique users' has increased from around 3 million in June 2007 to around 15 million in August 2008 and there is around 50,000 users using it at any point of time (Hendrickson 2007; Second Life 2008).

SL presents a flexible platform or a set of capabilities that are dynamic, tailorable, and malleable. It is accessible for free on the Internet. Its capabilities allow for a wide range of possibilities and do not suggest a particular mode or purpose of use. It is up to the users' creativity and innovation to leverage its capabilities to develop specific functionalities (Davis, Murphy et al. 2009). Therefore its adoption in business is challenging considering the lack of a pre-given prescription of use and value.

This study aims to explore the adoption of this new class of ambiguous technology in business and how value could be identified and realised in practice. To this end it explores the case of Mobile Office adoption of SL and confirms the results through a number of interviews with SL project leaders, developers, and business users in three large corporations.

Following the introduction, the second section reviews the IS literature on technology adoption and in particular open technology. The third section presents the technology enactment view. The fourth section presents the research methodology followed by a section presenting the case study. The fifth section

provides analysis of the case study followed by a section for the discussion and conclusion. The final section presents the theoretical and practical contribution of the study.

2 Adoption of open-ended technology

Pioneering research in the 1990s showed that Intranet, e-mail, Lotus Notes, and other groupware technology present cases of open technology which is malleable at the users end. Hence its organisational adoption does not follow a particular pattern of use or strictly achieved benefits. This line of research drew the attention that the adoption of flexible open ended technology raises additional questions regarding its use and how this technology could be benefited from within organisations (Orlikowski 1996). It also showed that the adoption of open technology challenges the traditional rational and planned technology adoption frameworks (Orlikowski and Hofman 1995; Ciborra 1996; Orlikowski 1996).

Through empirically-grounded and in-depth case studies, such research reveals that the end results of the adoption of this malleable technology in terms of organisational change and information structure are often emergent, unintended, and different to those originally designed (Orlikowski 1992; Orlikowski and Hofman 1995; Ciborra 1996). It also shows that the implementation is far from being a straightforward process and that the social choices that accompany it play a crucial role in determining the system's end results.

This body of research emphasises the significance of evolved and situated actions, reflecting the "improvisation" perspective, as opposed to the design perspective that has been dominant in IS research. The view of systems implementation as "improvisation" brought to IS research an understanding that had earlier been introduced into the organisational studies through the work of Lindblom and Weick (Lindblom 1972; Weick 1993). It provided an alternative view to the top-down, planned strategies for implementing new information technologies - in which each step of the change is defined in advance and the organisation then strives to implement these changes as planned in a specified period of time - are not particularly useful for the new class of open and customisable technologies, such as groupware, Internet, and Intranet. Instead, it proposes an improvisational strategy for managing change around groupware technologies that aims to accommodate and encourage ongoing organisational learning, experimentation, and discovery with the new technology in order to allow organisations to respond to, and even leverage, unanticipated outcomes (Orlikowski 1995; Orlikowski and Hofman 1995). This perspective was also extended to include the notion of "technology drift" that accounts for the technology's shift and deviation from its initial conception and plan during its implementation (Ciborra 1996; Ciborra 1997). It calls for celebrating this change and deviation and look positively at them as a source of innovation and inevitable outcome of the match between technology and organisation (Ciborra 2000).

It is noted that most of these studies have focused on the users end of the adoption process assuming that the system implementation phase is discontinuous and largely rigid (Elbanna 2006). It also focused on a particular class of flexible, open-ended, and user-malleable technologies such as groupware and Intranet which has some identified purposes in comparison to the extreme open technology of SL. The Virtual World Second life presents an example of a new class of flexible open technology. It differs from the open technology studied in the 1990s in that the latter had a general identified purpose at least for selling purposes. For example, IBM Lotus Notes is a groupware technology that offers technological capabilities – at that time limited to- such for group access to e-mail, calendars, shared databases, and discussion forums. It is open ended in the sense that the achieved coordination and collaboration and organisational impact depends on its use. However it should be highlighted here that there are identified areas of use and purpose for the application that the vendor use as selling points. Hence it has been presented as a platform of "applications to support co-operation" (Karsten 1995) broadly in terms of coordination, communication and collaboration (De Michelis 1990). In contrast, SL provides a flexible platform to build through the offering of generic capabilities that allow for a very wide range of possibilities for a wide range of users.

The vendor – Linden Lab- does not prescribe particular application, purpose of use or value for users. It rather presents it in vague terms as offering tools for organisations to develop “presence” and for individuals for “entertainment, experiences, and opportunity”¹. The extremely open-ended capabilities of SL in addition to its immersive features invite reconsideration of its adoption and use. Table 1 summarises the differences between SL and previously studies open ended technology.

Comparison aspects	Second Life as ambiguous technology	Traditional open-ended technology
Malleable	Both users and developers ends	Users end
Rhetoric of use	No formal rhetoric and vague suggestions of use	Formal rhetoric and cases of use
Features	Immersive 3D simulations	Typical IS communication features
development	On-going	Discontinuous phase
Build	Low cost and short development time	Collection of features to be configured
Availability	Free on the Internet	Licence agreement

Table 1: summary of differences between SL and traditional open-ended technology

The improvisation and drift perspectives foreground the cognitive, organisational, and individual issues involved in IS adoption and use that make it more of an improvised drifting activity and less of a straightforwardly planned one. Building on this research and considering the ambiguity and high malleability of SL, the concept of enactment could provide a framework to understand how people make sense and find benefits of SL. The concepts of improvisation and drifts were valuable in understanding the evolution of organisational change and work practices transformation away from the expected and planned route. Enactment focuses more on the interplay between the cognitive and the dynamic of actions as discussed below which could help in understanding the unravelling of possible business use and benefits from SL.

3 Technology Enactment

The concept of enactment emphasises the importance of action in people’s attempts to make sense of their situations. It is rooted in Follett’s work that emphasises the co-production of the action and stimulus. This work has been re-introduced and presented by Weick (1995) to emphasize the fact that in organizational life, people often produce part of the environment they face. There is no single fixed environment that exists detached from and external to the people. Instead people are very much a part of their own environment. “They act, and in doing so create the materials that become the constraints and opportunities they face” p.31. The concept of enactment implies co-determination between subject and object in the process of sense making. This process has been described by Follet (1924) as “relating”. She states: “As we perform a certain action our thought towards it changes and that changes our activity.” (Follett 1924, p. 62).

In his development of the concept of enactment, Weick was also influenced by Porac et al. (1989) work. Porac and colleagues argue that the material and cognitive are thickly interwoven in a “loosely coupled ‘enactment’ process in which each is determined partly, but not solely, by the other” (Porac, Thomas et al. 1989, p. 400). Studying the Scottish knitwear industry in Hawick, they argue that the Hawick group of producers and their business environment jointly constructed one another as a result of material and technical choices. These actions create “market cues” rather than respond to a pre-given environment.

¹ “Second Life is a 3D virtual world created by its Residents (people like you) that’s bursting with entertainment, experiences, and opportunity. The Second Life Grid™ provides the platform where the Second Life world resides and offers the tools for business, nonprofits, educators, and entrepreneurs to develop a virtual presence. (Linden Lab, <http://lindenlab.com/>, Accessed 23 Nov. 2010)

Perception of these enacted cues by Hawick manufacturers alters their mental model which subsequently guide their strategic choices. This idea was represented graphically as in *figure 1*:

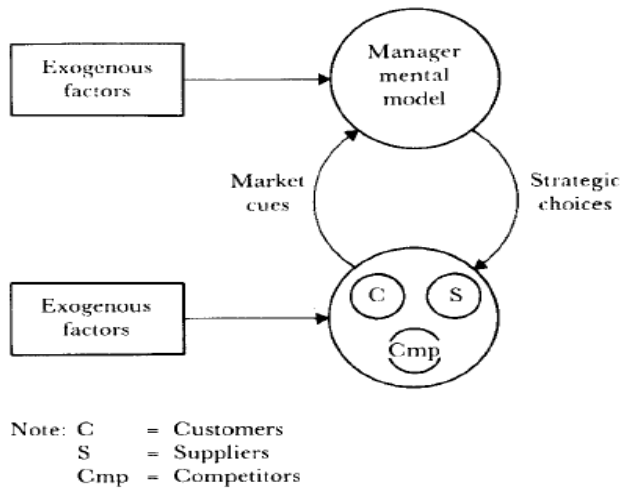


Figure 1: Reciprocal influence of the technical and cognitive levels of analysis [Source: Porac et al., 1989, p.399]

The word “enactment” has been used in information systems in most cases in its dictionary sense and not necessarily the concept as developed by Weick, Porac and others. One of the earliest and widely quoted use are the studies by Orlikowski (1996,2000). Orlikowski (1996) studied Lotus Notes in the disguised Zeta corporation to reveal the users enactment of their work practices and the resulting organisational change over time (Orlikowski 1996). She later extended the analysis of this case and compared it with another case of Notes Technology in Alpha Firm to conclude that the use of technology could be viewed as a process of enactment (Orlikowski 2000). Orlikowski states that: “The notion of enactment used here is related to but broader than that given currency by Weick (1979). It is intended here in the conventional sense of “to constitute, actuate, perform” (Oxford English Dictionary) or “to represent in or translate into action” (Merriam-Webster Dictionary)” (Orlikowski 2000, Endnote 2, p. 425). The focus was hence on how people as they interact with Lotus Notes technology in their ongoing practices, enact structures which shape their emergent and situated use of that technology. The notion of enactment as the intertwining relationship between the material and cognitive which is in the heart of Weick’s idea was not adopted in favour of applying structuration theory and adopting the notion of structure. In the attempt to achieve a higher level of theorisation, the technology under study was glossed over and received little description of its properties.

4 RESEARCH METHODOLOGY

This research follows the interpretive tradition in information systems. It aims to explore the phenomena and provide a practice-lens view of how small businesses adopt flexible technologies. A case study approach has been adopted as a vehicle to provide in-depth understanding of the adoption process (Stake 1995). Data collection in Mobile Office took place between June and October 2008 in two phases. The first phase lasted 3 months from June to August 2008. It adopted an ethnographic approach to enquiry (Van Maanen 1988; Rosen 1991; Myers 1997). During this period the researcher had regular meetings with the designer in the development site in SL. The researcher also maintained regular e-mails with the designer and received his weekly ‘to-do’ list on a regular basis and has regular discussions of the additions

and changes from the list. The second phase of data collection took place in the period between September and October 2008. It included in-depth face-to-face interviews with the parties involved. The project was then followed up till Jan 2009.

Themes have been identified in the data and data was then analysed according to the line of thinking that was dominating the development activities at that time into three categories: marketing purposes, improving current product, and new product offerings (Miles and Huberman 1994). The position of all parties was then further analysed in depth to explore their relations with entities outside the business, how ideas developed and moved from one category to the other, and the progress and development of different actors and relationship.

The reported case study presents part of a larger research project to explore how organisations make business sense of the new class of ambiguous technology such as Second Life.

5 CASE STUDY

Mobile Office is a small company of 25 employees. Its main business is to rent furnished and IT connected desk space. The desk space comprises a trendy designed open plan work stations. Each work station enjoys a broadband connection to the Internet, connection to printers, Voicemail, and connection to the reception that provides secretarial assistance to workstations. It also rents meeting rooms equipped with electronic whiteboard, video conferencing, and internet connection. These affordable desk spaces are mainly rented to freelancers, small businesses and start ups that need a permanent address and office-like facilities in central locations, thus Mobile Office offers long term offices for rent as well as hot desks for day use.

5.1 Use of technology

In 2002, Mobile Office was founded and the owner and CEO started to look for ways to advertise the newly established business. He came across on-line search engines and started to use them as an advertising tool as described:

“I heard about Google, started using it as a consumer for a while and I heard Google launched Google adverts campaign. I started to think if it was appropriate for our company to advertise through Google. I was surprised that very rapidly we started to build traffic on our website, increase awareness and very very shortly within few weeks-probably a month- we started getting new clients. We then –obviously- increased usage and knowledge of search engines in particular Google, but you know, in a certain degree Yahoo, and we increased our campaign to increase the number of keywords, to have some translations, and to increase the number of coverage. The end results were our business really grew substantially by 2003 and Google presented a great source of new clients.”

5.2 The Search for new technology

Whilst the use of search engines was successful and valued by Mobile Office, by 2006 the owner found that search engines, the business’ main advertising medium, became “too crowded” and their prices were increasing. At the same time he started to face more competitors. So he turned to find other media solutions that could provide similar services. He started to look at Web 2.0 social sites as an opportunity to advertise the business and offer the word-of-mouth aspect as follows:

“I saw web 2.0 very powerful to talk to friends and getting referrals, you know, the usual way of asking people and shop around.... I thought let’s use business sites and community sites to create referrals and references from clients, maybe we can have competitive advantage....so I registered in LinkedIn [a professional social networking site] and created a group there and also started to use Facebook”.

Soon he became one of the most linked people of the LinkedIn site with 29,470 connections and the business group became one of the largest with 38,485 members. In this context in 2007, he heard about SL and tried to learn more about it. He saw a startup company advertising specialist SL architecture and design services on Facebook Marketplace. He then contacted the owner of the start-up and invited him for a visit to explain what SL was and its business possibilities.

5.3 The adoption of Second Life

In November 2007, the owner and CEO of Mobile Office met the SL architect and owner of Design to explore the potentials of SL for business. Mobile Office then commissioned Design to build a 3D simulation of their latest facility. This new branch was then just opened and the owner wanted to showcase its trendy style in a trendy format. By end of June 2008, an SL site had been launched to advertise Mobile Office and provide a 3D simulation of the latest physical Mobile Office premises, a video of the simulation was posted on Mobile Office website. In early July 2008, the designer proposed to the Mobile Office owner to use the Mobile Office site in SL to create a novel distance conferencing system that connects web users to SL and allows the seamless sharing of different types of files between the two environments. The designer explained the idea at that time as follows: “Now it’s time to make the place do something funkyThe idea is to bridge the gap between RL meetings and distant participants who can’t make it, are abroad etc., but they can take part via Second Life”. Mobile Office welcomed the new idea and both designer and Mobile Office were enthusiastic to partner in the creation of such a novel idea. A system demo was installed on the SL site to allow CEO to see how the new system would work. The designer also registered his company on the SL Solution Provider Directory and applied for RegAPI access. RegAPI access allowed for the signing up of business clients to Second Life directly through the designer’s web site and straight landing at SL Mobile Office.

The demo was seen by the end of July by managers from the Linden Lab (the SL provider), ex-colleagues of the designer, other designers, some potential users and users of SL. In 22 July 2008 the designer e-mailed the researcher “I had a guy from Silicon Ireland who wants to use our site to hold their next international Web 2.0 conference in Second Life!”. In September 2008, while the new conference system build was in its Beta testing stage, the owner of Mobile Office and the designer were discussing the possibilities of renting the SL facility as a separate business for people in disparate locations looking for a secure, professional site to meet in SL to discuss business, share files and work together collaboratively in an immersive virtual 3D environment. As the owner and CEO of Mobile Office described it “I see it as extending my business. What business are we in, you know, we provide office space? Are people going to travel and use our services in the future? people [who] have Blackberry etc. I say we are in the business of providing communication facility for people.” In 2009, Mobile Office decided to expand its portfolio of business services to include designing and building SL presence for their clients.

6 ANALYSIS

The case study shows the unfolding process of Second Life adoption and value creation. The adoption process presents an enactment process inside and outside the organisation that involved many different actors. The following sections reveal the enactment cycle of SL technology as portrayed in *figure 2*.

6.1 Existing mental model and off-line enactment

Mobile Office business was defined as providing desk-spaces and address to businesses. Clients were perceived as people who need offices for their business. This view has been enacted through providing trendy offices supported by telephones, faxes, desktop computers, Internet connections, video conferencing service, and mail boxes. Other technologies such as search engines (Google and Yahoo) and web 2.0 social

sites and professional groups were used for marketing purposes and to spread the necessary ‘word of mouth’ about the company and its services. In general, technology was in use either to directly support clients’ work in Mobile Office or to serve as distribution channels for Mobile Office. The performance of the latter confirmed to the owner and developres that Web 2.0 provides marketing opportunities that need to be constantly followed and seized. With this history of Web 2.0 as distribution channels, the owner was actively looking for new Web 2.0 technology. When introduced to SL, the mental model of the owner was tuned to enact web 2.0 technology as a marketing tool. This impacted the choice of SL implementation to be a 3D advertising simulation and clip of Mobile Office. The clip was then posted on the company’s website.

6.2 3D Visual disruption and a new view on SL

The production of the 3D simulation and the posting of its video clip on the website provided cues to Mobile Office and the designers. It brought about strong visual views of the potentials of SL capability in mirroring real life activities which allowed the mental model of Mobile Office to depart from the experience of other adopted Web 2.0 technology. The thinking of SL moved towards its potentials as an office support tool not a marketing tool. Influenced by the existing office tools in their product portfolio such as video conferencing, SL was seen as yet another product that could provide a universal communication tool to be rented to Mobile Office clients. So however the thinking of SL has changed partly due to the technological cues, yet the idea of serving the Mobile Office existing clients persisted which in business terms means that Mobile Office continued with the existing business model as it focused on creating value for their existing customers (Chesbrough and Rosenbloom 2002).

6.3 Going on-line and the involvement of different actors

The decision to develop an SL-based conferencing system was materialised into a demo available on-line in SL². Once on-line, the developer decided to apply for joining the on-line official SL Solution Providers Directory. As the application went through the Linden Lab (SL provider) internal approval procedures, the provider teams became aware of both the demo and the developer. Consequently, the developer was contacted by one of the provider’s directors who expressed interest in his Mobile Office demo and requested a meeting to learn more about the project. A long conversation took place during which the developer learned about competitors, other development techniques and possibilities, the general administration of SL and planned future advancements, other virtual worlds, and some use cases. The developer also learned about contacts in the Linden Lab side who could provide him with technical support, advice, and consulting when needed. Following this encounter, the developer had conversations with different members of the provider’s local and European teams. He also decided to add a feature to the demo to alert him once there is an avatar visitor in the premises.

The demo was also visited by Avatars who are regular SL users. The developer met most of them, showed them around, discussed ideas, and received feedback. Some were interested in the build and provided feedback regarding mobility and features. Others were interested in the virtual conference room, tried it out, and gave feedback regarding its immersive feel, other needs during conferences, and other avatars movements that they felt useful. Other feedback on the design and functionality was also posted on-line on professional forums and were seen by the designer. The feedback given by this range of avatars altered the thinking of the SL-based conference system facility. Its design has changed to incorporate some of the received feedback.

² The demo was a detailed simulation of Mobile Office facilities and a simulation of a large conferencing room with simulation of standard equipments such as a projector, microphone, speaker stand, panel desk and chairs.

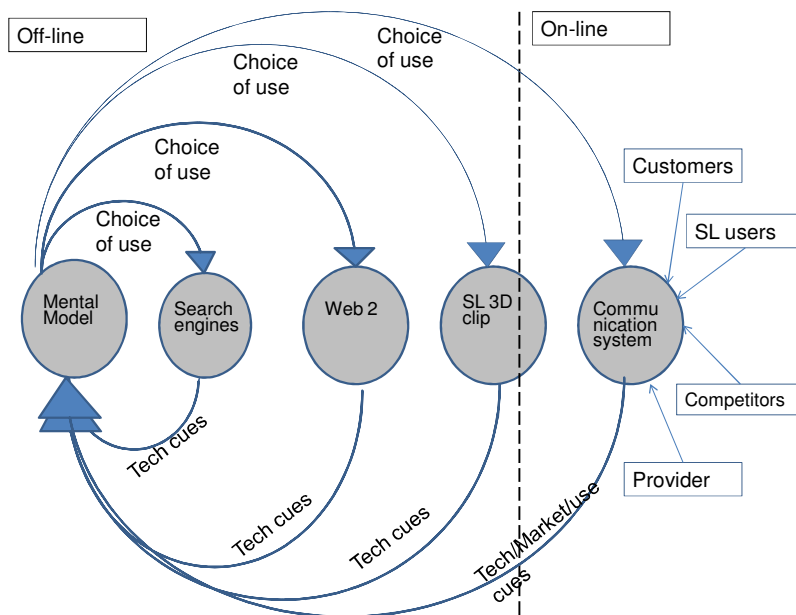


Figure 2: The enactment process of SL in Mobile Office

6.4 New market cues and decisions

One of the ideas that the developer learnt from Avatars was to get RegAPI to allow avatars to land directly on the Mobile Office premises on SL through links posted on websites. The developer applied for and gained RegAPI access. The link to SL premises was posted on both the Design company website and Mobile Office website. This new access increased the traffic on the Mobile Office SL premises. The SL Mobile Office site started to be visited by regular clients of Mobile Office, and others who were searching the web for meetings/conferencing facilities and found the link on the Mobile Office website. This is in addition to avatars who were exploring the SL environment. Some visitors expressed interest in renting the SL virtual conference room. This expression of interest brought about a new view of SL as a possible line of business. The owner started to review the possible pricing and methods of payment for this new service. The developer also reviewed the design investigating possibilities for access to clients who only rent the SL facility, security enhancements, and possibilities for moderation of such type of activity. The thinking of this new service redefined the business from providing office space and facility to “providing communication facility”. This redefinition encouraged the decision to adopt SL as a new line of business where income could be generated from the rentals of the SL facilities. The thinking of pricing and the way SL clients should book and pay for SL facility has led to a decision to acquire an e-commerce system. The use of this system was then extended for selling all Mobile Office service in both SL and real life.

6.5 New market cues and strategic decision to develop a new line of business

As the development of the new service was underway, the traffic on Mobile Office SL facility increased. Through discussions with some of the site visitors, the owner noticed the interest in the facility particularly from entrepreneurs and SMEs owners and their wish to have their own in SL. In discussion with the developers, they decided to expand SL line of business through offering “a complete [SL] setup, development, management and consultancy service” to give entrepreneurs and SMEs presence in SL. They offered this new service for a package setup and development fees followed by a monthly payments.

7 Discussion of Findings

The case study shows that the business adoption of extreme flexible technology such as Second Life follows a discovery path for finding use and value for it. It resembles an entrepreneurial activity that involves the discovery, creation and exploitation of opportunities (Shane and Venkatraman 2000). The discovery path for the technology is enacted by multiplicity of actors including humans and artefacts (Law 1992) inside and outside the organisation. These actors include the technology, the created artefacts, the clients who offer critical inputs that shape emerging paths (Von Hippel 1986; Kline and Pinch 1996), the technology provider who offer views on competitors, the market, the existing and forthcoming features, the technology fans/savvy who likes challenges.

Along the discovery path and due to the affordances of the virtual worlds, the enactment process moves from being off-line contained process to an on-line open process. Initially the enactment process is influenced by past experience, mental models, and enactment of other technology. In the reported case for example, the business definition and the generalised belief about web 2.0 technology benefits for marketing affected the way SL was initially perceived and consequently enacted. Thus, a business decision was made to produce a 3D immersive tour of the facility as another marketing tool for Mobile Office. This is in line with Norman's notion of schema where the new is evaluated against the existing experience (Norman 1976) and confirms Orlikowski's (1996) findings that in open technology, users initially continue their work practices with cosmetic use of technology (Orlikowski, 1996).

The production of the 3D immersive site presented a visual disruption to the existing mental schema. It brought about new SL technology cues that departed it from other web 2.0 technology. It stimulated the thinking of further possibilities of this type of immersive technology. A review of the business objectives and what it offers made the acceptance of the designer's idea of building an Internet/SL communication system acceptable. The new definition of the business as a communication provider to SME brought about the decision to invest in a new tool of communication for clients to be rented following the video conferencing model. As the new system went on-line in the SL platform, other actors became involved in the enactment process. The provider joined bringing in views about the technology, competitors, future technology development, interesting SL sites and developments, and technical experience. The visiting avatars brought a myriad to ideas regarding use, movability, immersion experience, other designers, on-line forums, and design and enhancement ideas. The visiting avatars were diverse including potential consumers, fans of the technology, explorers, designers, policy makers, academics, and IT experts from large corporations. Collectively, the visiting avatars feedback created market cues for Mobile Office which impacted further their views about SL. This contributed to taking a new decision to rent the SL conference room. The enactment of this new product line impacted on the business view of its operations and partly contributed to the decision to extend the on-line booking and payment system to other products lines. The enactment of the new product line and observing the avatars response and existing Mobile Office clients brought about other market cues that the immersive experience of SME made some clients to think of establishing a permanent presence in SL. This market cues advanced the mental model of SL and the business which allowed for a decision to add a new line of business to be taken. Table 2 summarises the cycles of enactment the SL project went through.

Cycles	Product	SL
Initial	Office Space	Web2 as a marketing tool
Cycle 2- after developing 3D simulation	Communications and physical offices	A communication tool
Cycle 3	Communication despite location	New line of business
Cycle 4	Communication	Expand SL line of business

Table 2: summary of the enactment cycles of SL in Mobile Office

The properties of SL cannot be ignored in discussion regarding its adoption. The visual and immersive experience it provides send strong cues to users that contribute to their further enactment. The nature of the development as partly off-line and partly on-line combines two models of innovation. The off-line development resembles a closed model of innovation Chesbrough, (2003). The closed model of innovation provides a start of the enactment process however limits organisational process of innovation (Chesbrough 2003), yet the 3D visual impact and the immersive feel stimulate a process of sense making (Weick 1990) where people try to find different ways for utilising such an immersive 3D technology.

The investigation of the reasons behind large corporation missing opportunities that rise from their R&D revealed that corporations used to follow a closed model of innovation where the company funnels ideas, discarding what appears unviable, and chose to further fund few projects(Chesbrough 2003). This process carries the risk of choosing the projects that are more familiar and obvious discarding projects that search truly new ideas. In the closed model, the company undertake R&D activities in secrecy away from competitors, customers, and other external parties. In contrast Spin offs which are characterised by being small start-up organisations that are owned by individuals establish connections with suppliers and customers that allow for the evolvment of the innovation which is termed ‘open innovation’(Chesbrough 2004). The on-line development of SL resembles the open innovation model. It allows firms to search for ideas outside their organizational boundaries. They should seek input from competitors, customers, suppliers, and vendors. The opening up of the enactment process significantly contributed to the creation of a new value network. It impacted the business/ technology mental model of Mobile Office to significantly change its existing business model to cover new market, new clients, new method of payment, and new ways of communication.

8 Contribution

The study reveals the history of SL value production in Mobile Office. It demonstrates that the value of extreme open technology is created through the process of technology enactment. Value is constituted through the enactment of technology and motivates this enactment. Authors argue that business models could constrain the self-making process as it presents a “dominating logic” that masks other possibilities (Prahalad and Bettis 1986). The case shows that a small business are less constrained by its existing business model as it maintains an entrepreneurial spirit of exploration, a vision to uncover concealed opportunities, and willing to move to a different model. In large companies, it is reported that this adaptation could be more cognitively bounded, as new information is filtered through a heuristic logic that was established from previous success (Chesbrough and Rosenbloom 2002; Chesbrough 2003), yet the immersive properties of SL and its visual disruption along with its speed of development and open innovation aspects allow large corporation to explore and enact this type of extremely flexible technology in a similar way to SMEs. The confirmatory interviews in large corporations-could not be presented for the space limitation- showed that they maintain similar entrepreneurial spirit in their enactment of SL. The low development cost and the fast speed of development allow SL development projects to be repetitively enacted. Large corporation encourage the enactment process by “throwing in” a range of visual presence and encourage employees to explore the possibilities of using it in business.

Researchers increasingly recognise web-based systems as a special class of information systems that requires the revisiting of the traditional concepts and development approaches (Kautz, Madsen et al. 2007) and in some cases the need for new ones (Baskerville and Pries-Heje 2002). The study contributes to this emerging line of literature and in particular the emerging Virtual Worlds (VW) adoption studies (Davis, Murphy et al. 2009). It highlights the role played by the features of the web-based technology on its development and use. The study focused on the role played by the 3D simulation and on-line presence features in the enacted development of systems based on VW technology. The immersive experience and

presence that VW provide should not be ignored in the study of its systems development, adoption and appropriation in business.

The study complements what Baskerville and Pries-Heje (2004) packaged as short cycle systems development. It shows that in the case of VW, the development is intermingled with use resulting in cycles of continuous development (Baskerville and Pries-Heje 2004). It also shows that in VW, the system is largely developed in an open innovation mode where technology providers, customers, competitors from the development and use side, interested VW users contribute to the development effort altering the organisational perception and definition of itself and its use of VW.

The study also contributes to E-commerce research in SMEs. It provides a detailed case study of the adoption of an extreme open technology and the created value. Previous research showed that e-commerce presents a business opportunity for SMEs and the value an SME could drive from e-commerce could exceed the value driven by big firms (Zhu, Kraemer et al. 2004). However, research in this regard tend to be survey based where issues of how and why a small business is using the Internet have been overshadowed (Al-Qirim 2004) in favour of aggregate findings and statistical analysis.

Regarding practice, Second Life is an extreme open technology. Organisations need to be aware that there is no prescriptive use or value proposition for its adoption and use. The adoption of SL and its value creation should follow a creative path where action plays a significant role in the unfolding of its use and value. The low cost and high speed of development should provide a path for its entrepreneurial adoption that would encourage its enactment process.

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