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(Niina Maarit Novak)

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List of Abbreviations

3D	=	Three-dimensional
ABI	=	Avatar-based Innovation
ABIP	=	Avatar-based Innovation Process
ABIPs	=	Avatar-based Innovation Processes
ABIs	=	Avatar-based Innovations
BPM	=	Business Process Modeling
BPMN	=	Business Process Modeling Notation
CRM	=	Customer Relationship Management
e.g.	=	Latin: Example gratia / for example
et al.	=	Latin: Et alii / and others
etc.	=	Latin: Et cetera / and so forth
f.	=	Following
Fig.	=	Figure
GIO	=	Global Innovation Outlook
HR	=	Human Resources
ICT	=	Information and Communication Technology
IPR	=	Intellectual Property Rights
ITM	=	Innovation and Technology Management
LAN	=	Local Area Network
L\$	=	Linden-Dollars (Second Life Currency)
MMORPGs	=	Massively Multiplayer Online Role-Playing Game
OECD	=	Organization for Economic Co-operation and Development
OSSCs	=	Open Source Software Communities
p.	=	Page
R&D	=	Research and Development
SL	=	Second Life
SN	=	Social Networking
USD	=	US-Dollar
V-Commerce	=	Virtual-Commerce
VR	=	Virtual Reality
VSWs	=	Virtual Social Worlds
VW	=	Virtual World
VWs	=	Virtual Worlds
WWW	=	World Wide Web

1. Introduction

The term Avatar-based Innovation (ABI) can be defined as “... *an interactive new product development process in which manufacturers collaborate with virtual worlds’ avatars along the entire innovation process beginning with the identification of new trends and unsatisfied needs and ending with the launch of new products and the improvement of existing ones*”.¹

In today’s economy innovations are commonly seen as the key to entrepreneurial success and as the backbone of economic growth and development, as they play a vital role when it comes to the livelihood of companies and market segments in general. This is due to technological advancements, ever shorter product life cycles and increasing market competition. In the past decades, innovation processes have been subject to a severe change. A change that led away from traditional manufacturer-centered innovation processes towards the much more collaborative form of user-centered innovation processes. This new form of innovation process yields great benefits for both manufacturers as well as users. This is because products and services can be tailored according to the wants and needs of customers, which ultimately results in higher sales and higher levels of customer satisfaction. In this context Avatar-based Innovations (ABIs) represent a new chapter of integrating users and potential customers into various steps along the entire innovation process.

When Virtual Worlds (VWs) first emerged, about a decade ago, they have been advertised as the next big thing that will not only revolutionize the social media landscape but as well e-Commerce. Today, a little bit more than 10 years later, some people might be even surprised when confronted with the fact that VWs are still around and react in a rather derogatory way when hearing about somebody’s experience and adventures in a Virtual World (VW). Although, VWs became environments for real economic transaction, offering many and very different business opportunities, they have not become the type of virtual shopping place originally envisioned.² Compared to other Social Media applications such as *Facebook, Twitter or YouTube*, VWs can definitely keep up in terms of user numbers as far as the target group of children is concerned. However, when taking a look at the target group

¹ Kohler et al. (2011), p.161.

² Turner et al. (2013). Retrieved on June 15th, 2013.

of people aged over 18, VWs do not receive the same amount of attention. Nevertheless, a very loyal niche group of users has kept them alive and turned VWs into creative social spaces with considerable virtual economies.³ In June, 2010 the total global virtual economy amounted to a value of around USD 5 billion. This value was expected to double by June 2013.⁴ These facts lead to the assumption that VWs have not yet reached their full potential and that they might stimulate and support the development of innovations, thanks to their very special and incomparable characteristics.

The concept of Avatar-based Innovations describes the act of moving the innovation process into a virtual world. This allows for an unprecedented form of web-based collaboration along the entire innovation process. As the topic of Avatar-based Innovations is a very recent one, this thesis is not only intended to provide the interested reader with a general overview of the topic, by reviewing relevant literature and recent developments as well as the main motivation factors for people to spend time in VWs, but it is especially devoted to finding out how companies can use virtual environments and avatars during different steps of the innovation process, in order to outline the innovation and collaboration possibilities within VWs and to provide an answer to the question “*Are virtual worlds breeding grounds for innovations?*”.

To do so this thesis is structured in the following way. Chapters 2-4 will each present one of the three core elements which are tied together in the context of Avatar-based Innovation Processes (ABIPs). Chapter 2 will focus on avatars and their real life counterparts. Innovations are at the center of Chapter 3 and Chapter 4 will discuss the topic of virtual worlds, their historical background and special characteristics. Chapter 5 is an excursus and deals with the economic potential, opportunities and challenges of VWs. Chapter 6 will present three selected case studies involving the use of avatars and VWs for innovation purposes. Finally Chapter 7 will summarize the major findings of this thesis, possible challenges when it comes to ABIPs and conclude by discussing future areas of research and likely developments.

³ Turner et al. (2013), Retrieved on June 15th, 2013.

⁴ OECD (2011), p. 14.

2. Avatars – Users and their Graphical Counterparts

An avatar is a fully customized, real-time, animated, 3D graphical character.⁵ These online embodiments are created and controlled⁶ by virtual world users in order to project their identity into the VW and to navigate three-dimensional spaces as illustrated in figure 2.1.⁷ The word “avatar” was originally used in Hinduism to describe the incarnation of their god Vishnu. In the context of VWs it refers to any visual representation of users.⁸ There are no restrictions on the way these animated, 3D, graphical characters can look like, behave or interact.⁹ Therefore, VW avatars can be human representations, animals or completely fictitious creatures. This is ensured by the fact that the basic shape, size, color and physical features of an avatar can be easily changed. For the purpose of this thesis however the definition of an avatar is limited to a virtual human controlled by a real-life VW-user. To customize avatars users can either personally create clothing and accessories or choose from a huge selection of different outfits provided within VWs.



Fig. 2.1: Screenshot 3D Avatar in Second Life

(Retrieved on May 13th, 2013 from <http://secondlife.com/whatis/avatar/>)

2.1. Different Identities

The idea and longing of people to take on alternative identities is not new. For centuries people used e.g. role-plays to satisfy this need. In our days technology has significantly expanded the possibilities leading to the fact that people have multiple online identities. For

⁵ Ducheneaut et al. (2009), p.1151.

⁶ Badler (1997), p.6.

⁷ Vasalou et al. (2008), p.801.

⁸ Hemp (2006), p.50.

⁹ Kaplan et al. (2009), p.566.

instance an undergraduate student will communicate with a friend by using two different voices, one to communicate via a cell phone and another one to communicate via *Facebook*.¹⁰ A male online blogger might take on a woman's identity to write a blog about fashion, while an elderly lady may have the identity of a 20 year old male when entering a chat room. Having multiple online-identities however shouldn't be associated with multiple personality disorder. In fact as well in real life, human beings change their identity from context to context all the time.¹¹ For instance, during a company meeting one might be a confident sales-man dominating the discourse. However, later on in the evening the same person might be a silent bystander while meeting former university buddies during a monthly get-together.

2.2. Affective Computing, Emotions and Body Language

Avatars represent a new chapter in science as far as affective computing¹² is concerned. Affective computing focuses on the ability of computers to recognize and interpret human affects such as emotions. Emotions are an inherent part of human beings, guiding behavior. One way for computers to recognize human emotions is through tracking human motions. This is because humans typically express their emotions not only through speech but as well in a non-verbal way through body language.¹³ Facial expressions or arm movements for instance can be used to draw conclusions about a person's state of mind. Avatars in this context represent an important interface between humans and computers. The special properties of avatars allow users to express their emotions via virtual body language. Although, automatic mechanisms which translate human emotions into avatar movements, e.g. through motion tracking sensors etc. are still in the future, users can already express their emotions through hands-on devices such as key-board combinations or mouse clicks which allow them to control avatar movements.¹⁴ The combination of written communication, oral communication and graphical representation, linked with human emotions expressed through facial expressions and gestures, makes avatars appeal more to human senses than ever before and considerably augments the in world experience of users.

¹⁰ Hemp (2006), p.50.

¹¹ Adrian (2008), p.368.

¹² Picard (1997), p.1.

¹³ Kleinsmith et al. (2006), p.1372.

¹⁴ Badler (1997), p.7.

2.3. Fields of Application

Today, avatars can be found throughout the web in many different settings, assuming many different roles. The range of applications includes the graphical representation in games and other applications for entertainment purposes, business spokespersons and sign language interpreters, the use in virtual teaching and business environments as well as in virtual simulations and trainings. The following sections will deal with each of the previously mentioned fields of applications in more detail.

2.3.1. Gaming, Entertainment, Socializing

Probably the most important field of application for avatars is the virtual embodiment of users in games and VWs specifically devoted to the purposes of entertainment and socializing. In these virtual environments users have complete control over their avatars and navigate them around the three dimensional settings. Examples include *The Sims*, *Second Life*, *Dragon ball* and *World of WarCraft* as illustrated in figure 2.2.

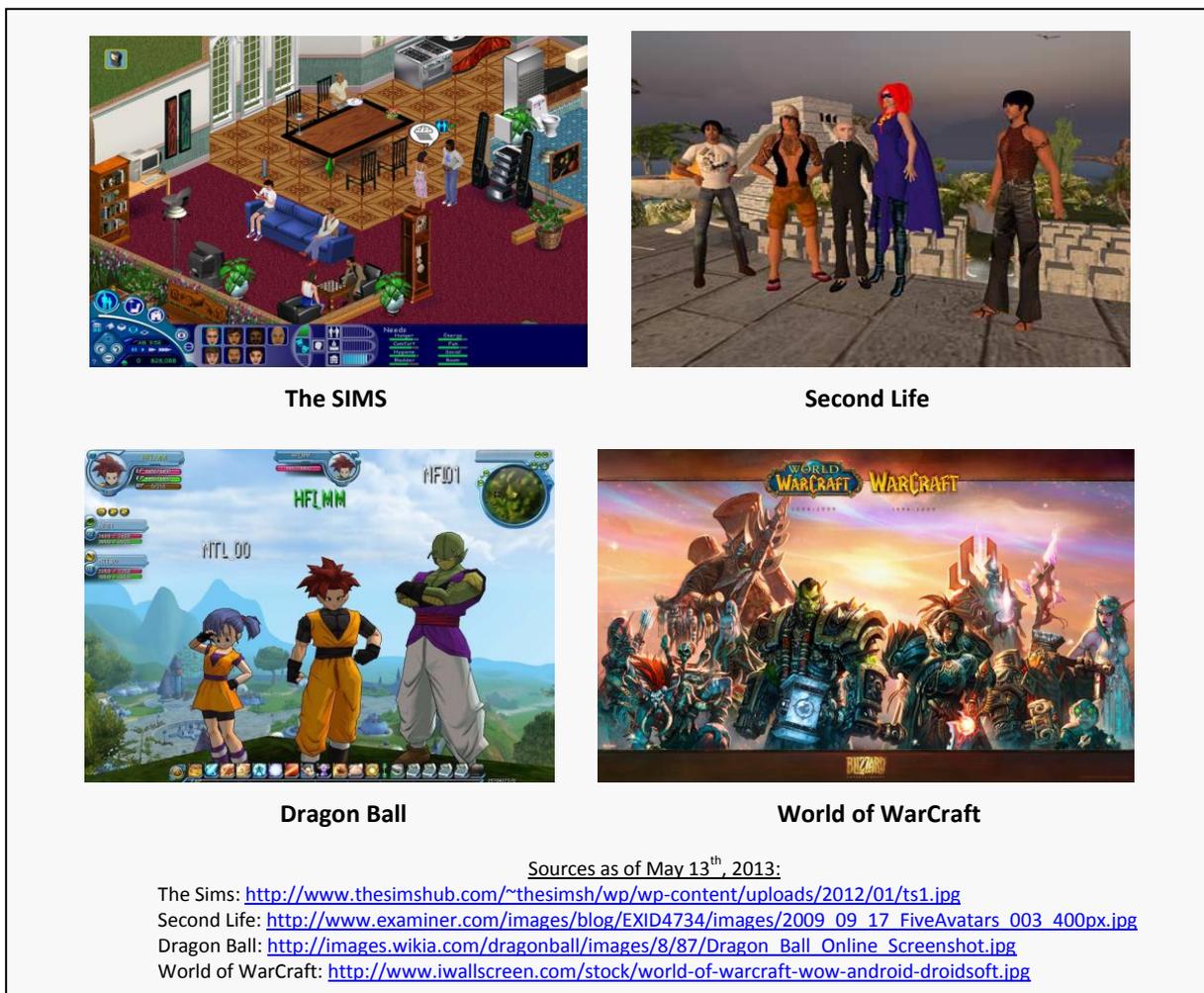


Fig. 2.2: Screenshots from different Online Games and Virtual Worlds

2.3.2. Business Spokespersons and Sign Language Interpreters

Avatars are frequently used by companies to present information either on their corporate website or in the setting of a VW. Thus, they are not only used for cyber communication and navigation but as well for advertising purposes. An avatar might welcome visitors when arriving at a virtual store and inform them about new products or discounts. Similar an avatar can welcome website visitors and guide them around a corporate website such as in the case of IKEA's Anna, as illustrated in figure 2.3. Anna is the furniture distributor's help-desk avatar, which assists visitors by providing answers to frequently ask questions, while visiting IKEA's website.¹⁵

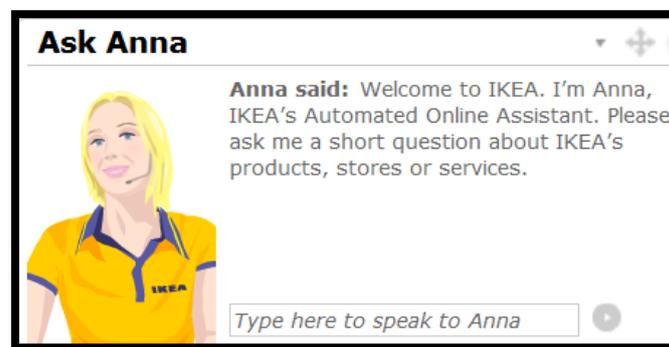


Fig. 2.3: Anna – IKEA's automated online assistant
(Retrieved on July 4th, 2013 from <http://www.ikea.com/gb/en/>)

Moreover, avatars are increasingly used in order to translate verbal and written communication into sign language. At the moment the three companies *SignTime*, *Matrixx* and *IBM* are jointly developing the sign language avatar "Simax", which should facilitate the life of deaf people by translating verbal and written communication, such as loudspeaker announcements at airports or railway stations, instruction package inserts commonly used in the pharmaceutical industry or instruction leaflets in general, into sign language. This collaboration is especially successful as each of the three enterprises can contribute valuable insights and know how. *SignTime* is responsible for the sign language content, *IBM* offers the access to new and groundbreaking technologies and *Matrixx* takes care of programming the Simax-Avatar.¹⁶

2.3.3. Virtual Teaching, Education and Conferences

Education can be found among the most promising applications for VWs and avatars. As of 2011, 150 Universities from all over the world were present in VWs such as *Second Life*

¹⁵ IKEA (AT), Retrieved on May 13th, 2013 from <http://www.ikea.com/at/de/>.

¹⁶ Schuh (2013) in DIE PRESSE AM SONNTAG May 5th 2013, online source accessed on August 16th, 2013.

and equivalents.¹⁷ Through avatars users can participate in virtual lectures, discussions, business conferences and coaching, tutoring or mentoring sessions. The great advantage of virtual education is that people from all over the world can come together at the same time and in the same virtual location to participate in one and the same virtual teaching session and therefore the total learning experience becomes richer and more diverse for everyone.



Fig. 2.4: Virtual Class Room – AVATAR Project

(Retrieved on May 13th, 2013 from http://www.avatarproject.eu/avatar/images/stories/Images/meetingroom_copy.jpg)

In order to promote virtual learning activities in secondary schools the European Union started in December 2009 a two year project entitled “AVATAR-Added Value of Teaching in a Virtual World”. This project was co-financed by the European Commission’s Comenius Program for Lifelong learning and was aimed to make students as well as teachers more familiar with the new opportunities and benefits that can be gained from virtual learning environments. Students and teachers were able to profit especially from the innovative learning-by doing possibilities in the setting of the VW *Second Life*, as well as from increased levels of student participation in tasks and discussion rounds thanks to the integration of innovative ICT applications.¹⁸ Figure 2.4 shows a virtual class-room in SL during the AVATAR project.

2.3.4. Simulation and Training

Complex tasks typically require a lot of training. These trainings are per se cost and time intensive. If such tasks furthermore require team work, such as in the case of emergency rooms, innovation processes or military operations, the creation of suitable training settings and the simulation of action become even more difficult. In this context VWs offer a great alternative reducing not only costs but as well hazards. In medical training for instance, future doctors are often supposed to train with real-life patients. However, the available

¹⁷ OECD (2011), p.3.

¹⁸ AVATAR Project, Retrieved on May 13th, 2013 from <http://www.avatarproject.eu/avatar/index.php?lang=en>.

number of training-patients is generally not sufficient, thus, virtual patients are used to fill the lack and offer an alternative training possibility as illustrated in figure 2.5.¹⁹



Fig. 2.5: Virtual Emergency Room

(Retrieved on May 19th, 2013 from <http://img.medscape.com/article/780/819/780819-figure-3.jpg>)

Similarly the U.S. National Institute of Health uses VWs to simulate and prepare for emergencies and disasters. Moreover, about 60% of *Second Life*-land owned by the US Government is used by the US Defense Department for security and defense trainings.²⁰ In those VW-trainings, avatars not only assume the role of participants and thus students, but as well of instructors who demonstrate correct behavior and draw student attention to mistakes and areas of potential improvement.²¹ After having explored the various fields of application, the following section will take a closer look at the individuals who control VW-Avatars.

2.4. Motivational Drivers

Why do people spend time in VWs? This question is one of the most significant ones, regarding VWs and avatars as it deal with the underlying motivational factors and reasons, which motivate human beings to spend time in VWs.

Motivation can be defined as the sum of all factors that influence the behavior of a human being. These factors, so called motives, manifest themselves primarily as needs and can appear as needs which are either desired or rather avoided.²²

¹⁹ OECD (2011), p.16.

²⁰ OECD (2011), p.17.

²¹ Rickel et al. (1999), p.578.

²² Schröder (1992), p.210.

When it comes to motivation, extrinsic motivation has to be distinguished from intrinsic motivation. Intrinsic motivation typically originates in the task itself and represents a certain value to a person, e.g. the fun, excitement and personal satisfaction related with the fulfillment of a specific task. Extrinsic motivation in contrast, doesn't originate in the task itself, but through extrinsic incentives which are provided a part from the task in order to motivate someone to fulfill a task. The most common form of extrinsic incentives; are monetary incentives, e.g. performance-related premium payments, special bonuses, etc. Extrinsic incentives include as well non-materialistic incentives such as symbolic prizes or awards. Extrinsic motivation factors for users to participate in VWs include the ease of use and economic value, while entertainment and escapism are examples for intrinsic motivation.²³ The differentiation between extrinsic and intrinsic motivators is also omnipresent in other studies including Kaplan et al. (2009), Zhou et al. (2011) and Eisenbeiss et al. (2012). These authors came to the conclusion that the key motivators for individuals to spend time in VWs fall into one of three major categories. These categories - functional, experiential and social motivators – are depicted in Table 2.1 and will be discussed in more detail in the following.²⁴

Motivational Driver	Individual's Assignment	Main Reason to Participate
Functional	Resident	fulfilling predetermined goals (shopping, earning money, doing business, attending a virtual lecture)
	Creativity Seeker	challenging oneself, creating purposes
Experiential	Explorer	satisfying the constant need to experience something new and exciting including primarily intrinsic motivations (search for fun, diversion and entertainment, role-playing)
	Refugee	immersing into a VW where dreams or fantasies might come true; users are getting the chance to live a second life
Social	Socializer	desire to meet and interact with people; a way to keep in touch with family members that are located in other parts of the world and to maintain contact with peers

Table 2.1: Categories of Motivational Drivers for VW-Users
(Own illustration based on Novak et al. 2013)

²³ Verhagen et al. (2011), p.205.

²⁴ Novak et al. (2013).

2.4.1. Functional

Many VW residents use VWs in order to fulfill predetermined goals. Therefore, VWs are used in order to carry out everyday tasks such as going shopping, earning money, or doing business. Chapter five will provide more information on the different forms of business opportunities and challenges that can be encountered in VWs. Business in VWs is possible, thanks to the fact that avatars are generally allowed to engage in economic activities with each other.²⁵

Other users, the so called creativity seekers²⁶, state that they use VWs for creating purposes. This is possible because VWs are places where users' creativity is hardly limited.²⁷ The possibility to design and build virtual objects allows creativity seekers to challenge themselves, to have a co-creation experience²⁸ and to come up with new and innovative solutions.²⁹ This draws not only the interest of users to VWs, but as well of companies. Chapters 3, 6 and 7 will focus in more detail on innovations and ABIPs. Another functional motivator for users is to participate in VWs for educational purposes, e.g. by attending a virtual university lecture or by participating in VW-training sessions.

2.4.2. Experiential

Some users satisfy their constant need to experience something new and exciting by exploring what VWs have to offer.³⁰ Experiential motivators for VW-participation include the search for fun, diversion, entertainment and role playing and thus primarily intrinsic motivation factors. Some users, the so called refugees, are also guided by the desire to escape the real world and immerse into a virtual world, where dreams or fantasies might come true, and where users get the chance to live a second life. For refugees to be interested in VWs it is especially important that the design of VWs goes far beyond realistic settings, allowing users to realize their visions. This is because refugees are usually unsatisfied with their real life and use VWs to create an entirely new identity for themselves.³¹

²⁵ Kaplan et al. (2009), p.566.

²⁶ Eisenbeiss et al. (2012), p.16.

²⁷ Zhou et al. (2011), p.265.

²⁸ Prahalad et al. (2004), p.6.

²⁹ Eisenbeiss et al. (2012), p.17.

³⁰ Zhou et al. (2011), p.265.

³¹ Eisenbeiss et al. (2012), p.16.

The experiential dimension of user-motivation refers as well to the users' degree of *augmentation vs. immersion*. Due to the special characteristics of VWs and utopian settings, users can immerse into a VW and experience behavior and activities which are alien to their real-world personalities.³² Section 4.1.1 will focus on the different types of immersion in more detail. Furthermore, for some users VWs represent an extension of real life, causing an augmentation of their quality of life e.g. through education and socializing possibilities.³³ Augmentation in connection with VWs however shouldn't be mixed up with *augmented reality*, as this term is generally used to describe computer driven applications which enrich a real-world experience by providing additional information.³⁴ Examples for augmented reality applications include traditional audio-tour guides or Google's latest product, *Google Glass*, which provide users with additional and useful information while e.g. walking through an exhibition or visiting a town.

2.4.3. Social

The special characteristics of VWs and the great variety of communication means encountered, involving innovative solutions such as motion tracking to enhance online avatar based communication³⁵, makes them a perfect place for socializing. Studies showed that for some users the desire to meet and interact with people represents the main reason to participate in VWs.³⁶ Socializers³⁷ typically use VWs as a way to keep in touch with family members that are located in other parts of the world and to maintain contact with peers such as friends or colleagues, while others enjoy going clubbing, dancing, to the movies or on a date in VWs.³⁸ Furthermore, VWs offer rather unexpected opportunities for social innovations including socializing possibilities for handicapped people or persons with diseases such as Parkinson, preventing them from engaging in similar socializing activities in reality due to their state of health.³⁹

³² Messinger et al. (2009), p.206.

³³ Kaplan et al. (2009), p.570.

³⁴ Bederson (1995), p.210.

³⁵ Eisenbeiss et al. (2012), p.16.

³⁶ Kaplan et al. (2009), p.569.

³⁷ Eisenbeiss et al. (2012), p.16.

³⁸ Zhou et al. (2011), p.265.

³⁹ Turner et al. (2013), Retrieved on June 2nd, 2013.

In addition research showed that the more time users spend in-world, the more similar their behavior becomes to the behavior shown in real life.⁴⁰ Moreover, studies suggest that individual motivators translate only into increased VW-user activities if the user finds peers that share the same motivation.⁴¹ Thus, as far as group dynamics within VWs are concerned, residents, creativity seekers, explorers, refugees and socializers are looking for peers sharing similar motivators and interests. After having explored the topic of avatars and VW-users, chapter 3 will now continue with the second core element of ABIPs, namely Innovations.

⁴⁰ Kaplan et al. (2009), p.570.

⁴¹ Eisenbeiss et al. (2012), p.17.

3. Innovations

Innovations are in today’s business world a key factor for entrepreneurial success. They are especially important for a company in order to remain competitive and to differentiate oneself from competitors. In addition, technological progress, increasing market dynamics and saturation levels as well as ever shorter product life cycles further highlight the importance of innovations nowadays as a way to ensure the long-term livelihood of a company. Thus, companies require innovations on a periodically basis to remain competitive in their respective industry segment.

The Austrian-American *Joseph Alois Schumpeter*, one of the leading economists of the 20th century, for instance strongly believed that economic growth is the result of fundamental innovations.⁴² In this context *Schumpeter* also introduced the term *creative destruction* which refers to the fact that when new products emerge on the market due to innovations, old products are destroyed to a certain degree. Some examples supporting this thesis include the destruction of the railway system due to the emergence of cars, the decline of landline phones due to cell phones and the disappearance of small grocery stores due to the construction of huge supermarkets and shopping malls. Similarly the Russian economist *Nikolai D. Kondratieff* developed the theory of *long economic waves*, which divides modern business history into five major cycles, each triggered by a fundamental innovation as shown in figure 3.1.⁴³

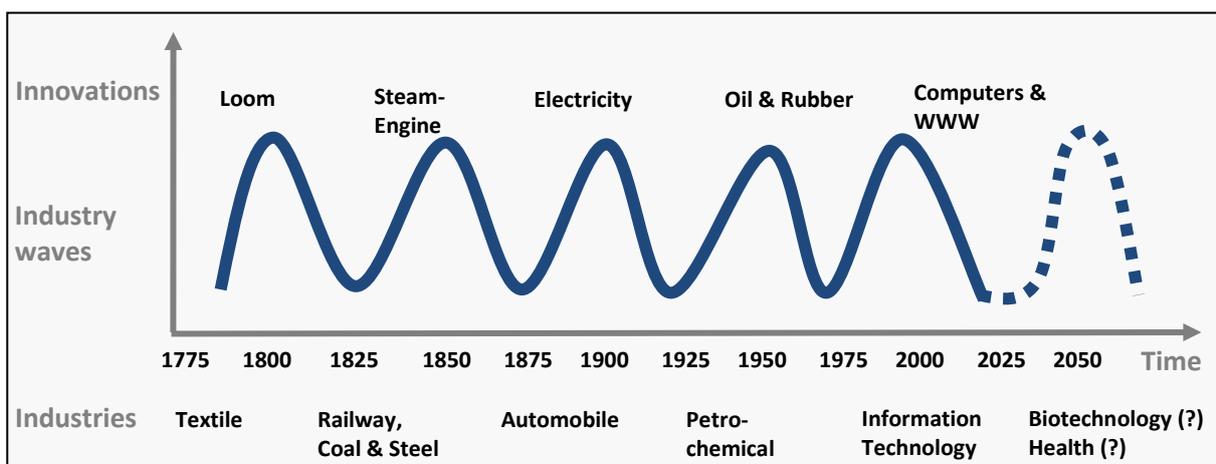


Fig. 3.1: Kondratieff’s long Economic Waves (Own illustration based on Berghoff (2004), p. 37)

⁴² Berghoff (2004), p.36.

⁴³ Berghoff (2004), p.274.

When taking a look at the past 200 years, illustrated in figure 3.1, it becomes obvious that the creation of the first automatic weaving loom was located right at the beginning of the textile industry. Similarly the introduction of the first steam engine was located in the early years of the industrial revolution and gave rise to the development of the railway, coal and steel industry. The invention of electricity was located right at the beginning of the automobile and car industry and more recently the discovery of new usage forms of rubber and oil gave rise to the petro-chemical industry. Finally in our days it seems that the creation of the first computer gave rise to today's information technology age and it will be interesting to see what kind of innovation will trigger the next big economic wave.⁴⁴

Innovations are the outcome of a long innovation management process which typically starts with many years of research and development (R&D) during which new knowledge is created, stored and applied in products and processes. The R&D phase is typically a very investment-intensive time for companies as during this stage no profits can be made and, furthermore, it is still uncertain if the investments will pay off in the future. Depending on the type of R&D, this phase can last from a couple of years to up to 45 years such as in the case of basic and fundamental research, before the innovation reaches the market.⁴⁵ This immense planning horizon, the invested capital and the high degree of uncertainty regarding an innovation's success on the market, are all reasons why innovations are highly risky. The R&D phase is followed by the production launch and subsequently the market launch.⁴⁶

Since in our times innovations occur only in the rarest of cases randomly the entire innovation process must be systematically planned, monitored and analyzed from the very beginning on, because a lot is at stake for companies. The innovation process is very dynamic and has four important characteristics that distinguish it from other business processes.⁴⁷ However, at the same time these four criteria also impede the innovation process:

- **Degree of novelty** (the higher the degree of novelty, the more complicated the innovation management process becomes)
- **Uncertainty/risk** (risk that the innovation might be a market failure)

⁴⁴ Berghoff (2004), p.274.

⁴⁵ Brockhoff (1999), p.54.

⁴⁶ Brockhoff (1999), p.71.

⁴⁷ Stummer et al. (2006), p.13

- **Complexity** (with an increasing number of people involved, the internal and external coordination processes become more and more complex)
- **Potential for conflict** (the previous three characteristics indicate that the potential for conflicts is especially high when it comes to innovation processes)

When it comes to innovations usually two main parties are involved, the innovation user and the innovation manufacturer. Both parties expect to benefit from innovations. Users benefit directly from innovations in terms of using a product or service, while manufacturers have to sell the product or service first in order to benefit from innovations.⁴⁸

The concept of innovation itself is hard to define and many different definitions and types exist. However, some characteristic can be found throughout all definitions because an innovation typically involves breaking up existing structures and combining existing or new components in order to create something new that is different from existing forms.⁴⁹ In the following section the most important types of innovations will be differentiated.

3.1. Types of Innovations

Depending on the degree of novelty one can distinguish between *objective* and *subjective innovations*. While *objective innovations* are a novelty to the entire world, the degree of novelty of *subjective innovations* is limited to an individual's or a specific group's point of view.⁵⁰

Product innovations include new products and services and are commonly perceived as a bundle of new characteristics that is different from previous ones. *Product innovations* have a market focus and are aimed to serve and fulfill the customer's needs in new ways. In contrast, *process innovations* have an internal focus as they are introduced to internal production or organization systems. The main focus of *process innovations* is to improve efficiency⁵¹ and thus to create a cost advantage⁵¹ rather than a differentiation advantage.⁵² Similarly *social or administrative innovations* are aimed to improve organizational structures

⁴⁸ Von Hippel (2005), p.3.

⁴⁹ Berghoff (2004), p.36.

⁵⁰ Stummer et al. (2006), p.17

⁵¹ Brockhoff et al. (1999), p.62.

⁵² Porter (1985), p.3.

and the employees' well being.⁵³ While the main function of *market innovations* is to expand a company's market spectrum.⁵⁴

Another differentiation can be made depending on the innovation-trigger. Innovations that originate on the customers and thus market side are so called *demand pulls*. In the case of *demand pulls* the existing market demand for a new product or service causes producers to come up with new innovative solutions. In contrast, *technology pushes* are initiated by R&D departments due to the availability of new knowledge and technologies.⁵⁵

A rather recent type of innovations, are *open innovations*. In the case of *open innovations* companies either receive external knowledge which becomes subsequently incorporated in the innovation process or they provide internal knowledge and know-how to external partners.⁵⁶ Thus, *open innovations* enable and support collaboration during the innovation process. *Open innovations* are typically differentiated from the reverse type of innovations, namely *closed innovations*.

Finally, depending on the degree of radicalness, *radical innovations* are distinguished from *incremental innovations*. *Radical innovations* are fundamental changes which typically have a very high degree of innovation and are also subject to a high level of risk as the innovation's market success is uncertain, while *incremental innovations* represent only small advancements and have thus a low degree of innovation and are less risky.⁵⁷ In terms of innovations, VWs would be considered not only *radical technical innovations* but as well *social innovations* as they represent a new way for people to socialize and to interact with each other.

3.2. Innovation and Technology Management

When it comes to Innovation and Technology Management (ITM) first of all some basic terms and their relationship have to be defined. The first three terms that have to be distinguished from each other are: *theory*, *technique* and *technology*. A theory consists of a

⁵³ Brockhoff et al. (1999), p.59.

⁵⁴ Stummer et al. (2006), p.16.

⁵⁵ Stummer et al. (2006), p.19.

⁵⁶ Chesbrough et al. (2006), p.1.

⁵⁷ Brockhoff et al. (1999), p.65.

number of hypotheses which are related to each other. The term technology however is used to describe scientific knowledge which is applied in order to solve problems and a technique is the concrete application of technology as part of products and production processes. The example of glass-fusing makes this differentiation more obvious. The fact that glass can be melted at a very high temperature represents the basic theory. The process of melting glass at a temperature of 788-830 C° in a special furnace represents the technology and if this technology is used for the production of e.g. glass-furniture or wash-basins, it becomes a technique.⁵⁸

In addition the three terms *invention*, *innovation* and *imitation* should be differentiated. An invention is typically a time-bound creation and represents the first technical implementation of something new or a new combination of existing elements. If inventions occur by chance, such as in the case of the company 3M and the invention of *Post-Its*, these inventions are subject of the so called serendipity-effect. The definition of the term innovation however, is much more complicated. Some authors agree that once an invention penetrates the market, an invention transforms into an innovation. Although, this definition applies to product innovations, it applies only partly to process innovations and again less to social innovations.⁵⁹ Finally imitations are product-replicas that are based on knowledge gained from rival firms.⁶⁰ Figure 3.2 illustrates the complex relationship of Innovation and Technology Management.

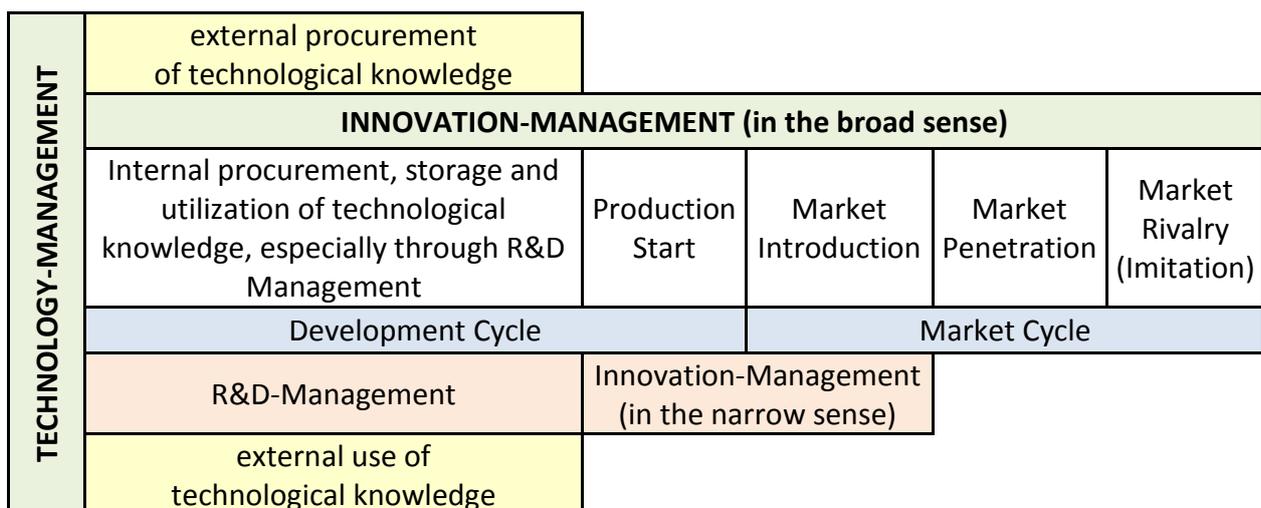


Fig. 3.2: Distinction - Innovation and Technology Management
(Own illustration based on Brockhoff (1999), p. 71)

⁵⁸ Stummer et al. (2006), p.7.

⁵⁹ Stummer et al. (2006), p.10f.

⁶⁰ Stummer et al. (2006), p.12.

When taking a look at figure 3.2 it becomes immediately obvious that Technology-Management is part of Innovation-Management and vice versa. Technology-Management focuses mainly on the procurement, storage and utilization of technological knowledge. Knowledge procurement and utilization can be both external and internal. When it comes to internal procurement and utilization the responsibility lies mainly within the R&D department. The storage of knowledge through documentation and mechanisms to protect it from third parties as part of Technology Management is especially important because knowledge represents a competitive advantage for companies and has thus as well an economic value. As shown in figure 3.2. R&D-Management is not only a vital part of technology management but as well of innovation management which encompasses as well the development and market phases of new products and processes. The development cycle of innovations includes besides the R&D Phase as well the production start phase. In contrast the market cycle consists of the market introduction, penetration and rivalry phases. Thus, Innovation-Management in the broader sense refers besides R&D as well to the development, production and market introduction of new products and processes and focuses therefore as well on the non-technical phases of the innovation process.⁶¹

3.3. Innovation and Technology Life Cycle Concepts

Once on the market, product innovations follow the typical product life cycle including the stages of introduction, growth, maturity and decline. Therefore, when depicting the production innovation life cycle, by using the variables time and sales the result would be the well known Gaussian bell-shaped curve. The life-cycle of technologies however is typically depicting as an S-shaped curve, as illustrated in figure 3.3, by contrasting time or cumulative R&D expenditures with a parameter “p” representing the technological performance of a technology.⁶²

During the introduction phase, *new technologies* with low competitive influence and little integration in products and processes dominate. The following growth phase is characterized by the largest increase of technological performance as illustrated in figure 3.3. During the growth phase *new technologies* become *pace technologies* with high competitive influence but still little market penetration. The growth phase is followed by the

⁶¹ Brockhoff (1999), p.70f.

⁶² Stummer et al. (2006), p.31.

maturity phase during which technologies transform into so called *key technologies*. *Key technologies* are massively integrated in products and processes and have high competitive influence. During the final saturation phase the technological performance reaches its maximum and technologies become standards. These standard technologies, the so called *base technologies* are integrated in the majority of new products and processes, however their competitive influence is limited.⁶³

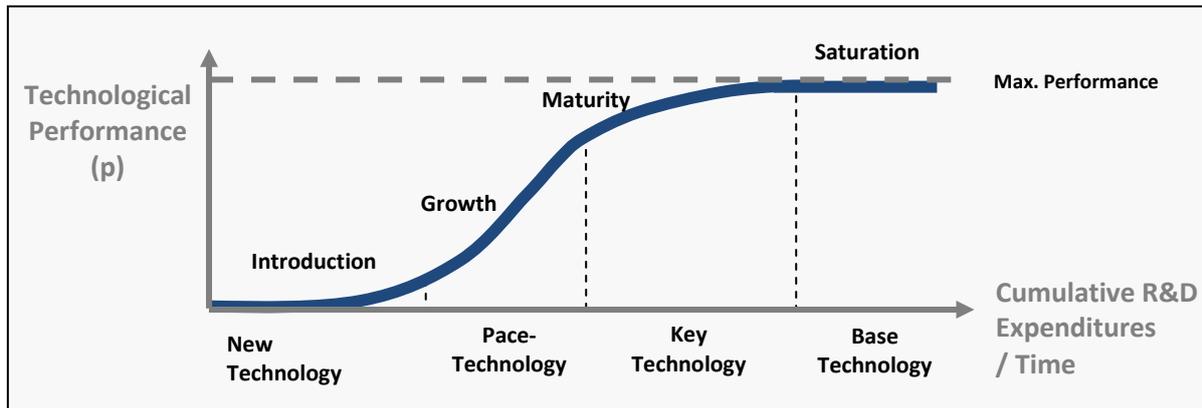


Fig. 3.3: Technological Life Cycle (Own illustration based on Stummer et al. (2006), p. 31)

One of ITMs most important tasks is to define the most beneficial point of time to switch from one technology to another. In this context the S-shaped curve is a very useful tool, providing information on how far the existing technology can be still improved.⁶⁴ The transition from one technology to a new technology is depicted in figure 3.4.

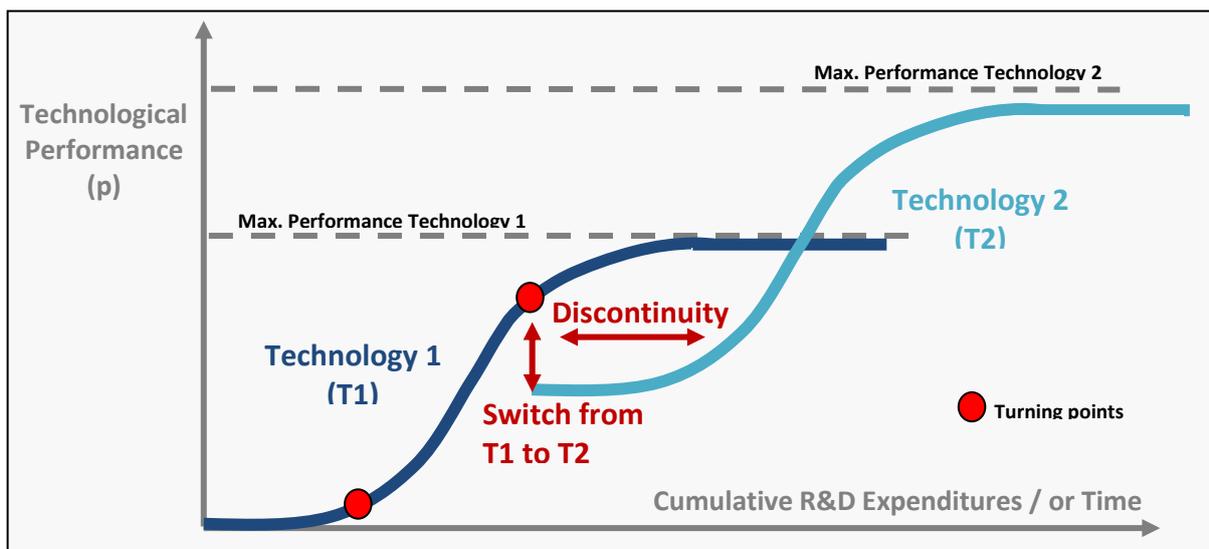


Fig. 3.4: S-Curve Concept (Own illustration based on Stummer et al. (2006), p. 34)

⁶³ Brockhoff (1999), p.34.

⁶⁴ Foster (1986), p. 107.

During the introduction phase a new technology requires heavy investments in order to reach the growth phase. Therefore, when deciding to change from one technology to a new one, companies should have a financial cushion, especially because initial sales results are most of the time unsatisfactory or even negative. At the beginning of the maturity phase, which is characterized by a decrease in the increase of technological performance and thus located at the second turning point of the S-shaped curve for technology 1, as depicted in figure 3.4, technologies have typically almost reached the limit of their technological performance. Thus, this second turning point is exactly the point of time when companies should switch to a new technology, as investments into the old technology can only yield small increases in technological performance, while heavy investments in a new technology allow the company to reach a degree of technological performance well above the old technologies' performance maximum.

Nevertheless, finding the right time to switch from an old to a new technology still remains a very tricky undertaking. If a company decides to switch to early, it is very likely that the full potential of the old technology cannot be exploited. However, if the company switches too late, competitors might have already gained substantial market-advantages with their new technologies and it might be hard to catch up with them.

3.4. User Introduced Innovations and Co-Creation

For the past hundreds of years innovations were mainly the work of pioneers or the outcome of manufacture-centered innovation development processes.⁶⁵ However, in recent years there has been a significant change in this pattern, as the much more collaborative form of user-centered innovation processes gain more and more importance. At the heart of this new approach is the co-creation of products and processes together with consumers, which fundamentally changes the traditional roles of users and manufacturers.⁶⁶ From an economic point of view this shift from manufacturer-centered to user-centered innovation processes can be easily understood and goes hand in hand with the fact that companies invest a great deal of time and money into profoundly understanding user needs and CRM in general. This is because new products and services have to fulfill user needs in order to be

⁶⁵ Von Hippel (2005), p.1.

⁶⁶ Prahalad et al. (2004), p.9.

successful on the market.⁶⁷ Until now, most companies used traditional market research techniques such as surveys. However, these techniques provide only limited information as they tackle the topic of needs only at its surface. Moreover, needs change constantly as does the market and therefore a new approach was needed.⁶⁸

This new approach is called user-introduced or user-centered innovation. User introduced innovation processes belong to the larger group of *Open Innovations*, a term used to describe the implementation of internal and external knowledge, ideas and facilitators into innovation processes. This type of innovation process usually involves the stages of idea generation & screening, product design & development, a pre-launch testing phase and finally the commercialization phase.^{69,70} In the case of user-centered innovation processes manufacturers not only outsource part of the innovation process to users, but they establish as well a working environment in which manufacturers and users engage in the co-creation of new products and processes. This co-creation manifests itself in a co-creation experience which functions as a motivator for both manufacturers and users. Thus, it is important for companies to invest time and money into the infrastructure and interaction possibilities which shape the working environment and thus determine the quality of the co-creation experience.⁷¹ In fact the question whether a company is able to create a valuable co-creation experience determines the success of the entire collaboration.⁷² Having said this, VWs considerably contribute to the co-creation experience by transferring the innovation process into a new, and probably for most participants, unexplored and thus exciting virtual environment.

Co-creation yields benefits for both parties as manufacturers can learn from users and vice versa. Users can be both firms and individuals. On the one hand by giving users the possibility to co-develop and tailor products and services that respond exactly to their needs, users don't have to rely anymore on manufacturers to develop certain products.⁷³ On the other hand manufacturers receive new ideas for the design of products and manufacturing

⁶⁷ Von Hippel et al. (2002), p.821.

⁶⁸ Von Hippel et al. (2002), p.821.

⁶⁹ Füller et al. (2010), p.1377.

⁷⁰ Hoyer et al. (2010), p.290.

⁷¹ Prahalad et al. (2004), p.6.

⁷² Prahalad et al. (2004), p.9.

⁷³ Von Hippel (2005), p.1.

processes and furthermore they gain additional information about customer desires, motivators and behavior.⁷⁴ In this sense the user-centered innovation approach represents as well a certain democratization of the entire innovation process. This is because a user's role is not limited anymore to only having needs as users engage actively now in the innovation development process and in fact many studies showed that this engagement yields great results.⁷⁵ Furthermore, user introduced innovations seem to increase social welfare as users are less reluctant to share their innovations with a broader community, as will be discussed in the following, compared to manufacturers who's economic wellbeing relies on keeping their innovations a secret.

3.4.1. Innovator-Communities

Innovation communities can be defined as information nodes, consisting of both individuals and firms, which are interconnected by information transfer links. Innovation communities might, but must not exist, within the boundaries of membership groups and typically focus on innovations of a specific market niche.⁷⁶

Through sharing individual innovations and ideas, and thus through behaving in a collaborative manner by assisting each other, innovation communities can increase total social welfare. This is because users can access the existing knowledge base, and draw ideas from other members rather than having to invest resources to come up with similar results. In addition innovation communities are made up by people with very different backgrounds and ideas which stimulate diversity and creativity, leading to many and very diverse innovations.⁷⁷ In fact many users voluntarily publish their work so that others can profit from their findings.⁷⁸ These ideas are frequently picked up by manufacturers leading to the result that user innovations improve the success rate of manufacturers.⁷⁹ This can be compared to the well known teamwork effect where the output of a team is higher than the total sum of all individual outputs.

⁷⁴ Prahalad et al. (2004), p.6.

⁷⁵ Von Hippel (2005), p.3.

⁷⁶ Von Hippel (2005), p.96.

⁷⁷ Von Hippel (2005), p.94.

⁷⁸ Von Hippel (2005), p.77.

⁷⁹ Von Hippel (2005), p.107.

Open Source Software Communities (OSSCs) are a great example of how well innovation communities can work. When it comes to software, discovering and fixing code errors can be very costly. However, when OSSCs take on the same task it can be solved much faster and costs can be greatly reduced. This is because within the large community of software users it is very likely that some users have the necessary information to solve some errors, while others have the additional information to solve other errors. Thus, given a large enough group of beta-testers and co-developers, nearly every problem can be quickly identified and fixed.⁸⁰

Critical to the well being of innovation communities is the willingness of at least some community members to voluntarily reveal innovations of interest to others. Innovation communities typically offer some sort of physical or virtual publication libraries and additional functions such as chat rooms or email lists informing about recent postings in order to support members and the development of innovations in general. Furthermore, when innovator-communities and manufacturers enter into a co-creation relationship, the creation of unique value becomes the aspired and mutual goal.⁸¹ The success of this relationship depends on the quality of interaction between the two parties, which is influenced by the following factors.⁸²

- **Dialogue** (Involves listening, shared learning and continuous communication in order to create an open and loyal community.)
- **Access** (Availability of information and tools.)
- **Risk assessment** (Should customers share the firms' risks when actively participating in the co-creation of products and processes?)
- **Transparency** (The increasing interaction between user and manufacturers erases the information asymmetries, regarding prices and costs, which traditionally favored manufacturers, as co-creation and production requires high levels of transparency.)

Besides the previously mentioned four aspects, there is one more factor which determines the quality and efficiency of the collaboration namely trust. Trust is a necessary

⁸⁰ Von Hippel (2005), p.94.

⁸¹ Prahalad et al. (2004), p.1.

⁸² Prahalad et al. (2004), p.6f.

prerequisite for any successful collaboration. Thus, both sides must trust their co-creation partners and the respective levels of trust are influenced by all four factors.⁸³

3.4.2. Property Rights

A very interesting issue when it comes to user-centered innovation processes, innovation communities and the freely reveal of innovations are intellectual property rights (IPR). By theory protection mechanisms such as patents, should increase innovation investments. Reality however shows, that these protection mechanisms are not suitable for every innovation, as they are costly to obtain.⁸⁴ In fact it appears that the social welfare losses caused by patents, aimed to protect minor innovations developed within innovator-communities, are bigger than the protection advantages. Thus, minor innovators, such as in the case of innovation community members, prefer to not make use of these IPR mechanisms.⁸⁵ In other words the bad outweighs the good when it comes to IPR in connection with innovation communities.

Companies in contrast, typically value and rely upon IPR and standards to remain competitive. However, due to the change towards Open Innovations in recent years, traditional IPR-strategies have to be updated.⁸⁶ The basic challenge here is to find the optimal mix of, on the one hand, secrecy and protection mechanisms in order to remain competitive and on the other hand of openness and transparency required for collaboration, dialogue and in order to encourage participation. Finding the optimal equilibrium is even more difficult today, as competition further increased, following the shift towards Open Innovation Processes and the resulting increase of vertical specialization.⁸⁷ Besides the necessity to change existing IPR-strategies and established standards, ABIPs also raise other important legal questions that have to be solved such as: Who owns a virtual prototype, which has been developed in a virtual environment with collaborators from different countries?⁸⁸ Besides innovation communities and IPR, innovation toolkits are another important requirement in the context of ABIPs. Thus, innovation toolkits will be further discussed in the following section.

⁸³ Prahalad et al. (2004), p.9.

⁸⁴ Von Hippel (2005), p.112.

⁸⁵ Von Hippel (2005), p.113.

⁸⁶ Enkel (2009), p.314.

⁸⁷ Chesbrough et al. (2006), p.180.

⁸⁸ Kaplan et al. (2009), p.568.

3.4.3. Innovation Toolkits

An important prerequisite for the increase of user-centered innovations are continuous improvements in computer software and hardware, which allow users to work on innovations with the help of increasingly capable and steadily cheaper tools that require less and less skills and training.⁸⁹ Toolkits are by definition integrated sets of tools which assist end-users to perform tasks regarding product design and prototyping.⁹⁰ Thus, innovation toolkits augment the co-creation experience by equipping consumers with an instrument to exercise choice.⁹¹

The toolkits-approach tackles the innovation-problem from another point of view by dividing the problem into subtasks and grouping them into tasks that require need-related user information on the one side and solution-related manufacturer information on the other side.⁹² The separation of user and manufacturer related tasks, represents one of the key advantages of the toolkits-problem solving approach. This is because it allows for concurrent collaboration as users can focus on one aspect, while manufacturers focus on another aspect of the innovation process. This can be better explained with the help of an example. In the case of a t-shirt for instance, most fabrication aspects have been standardized and can be solved by manufacturers themselves, with the help of product-development information available to them. Design-aspects however require need-related user information which is not available to manufacturers but can be gained from users. Design-tasks can therefore be transferred to users by equipping them with appropriate tools. Through providing consumers with tools to design products, manufacturer can make sure that the final products respond to the expectations of users, which is a way to ensure market success. Furthermore, custom made toolkits with predefined elements, restrict users from creating products that can't be produced due to manufacturing limitations and therefore toolkits transform some of the information, traditionally only available to manufacturers, into explicit information provided to users.⁹³

⁸⁹ Von Hippel (2005), p.122.

⁹⁰ Von Hippel (2005), p.147.

⁹¹ Prahalad et al. (2004), p.9.

⁹² Von Hippel (2005), p.147.

⁹³ Von Hippel et al. (2002), p.823.

The previous example shows that the toolkits-approach differs greatly from the traditional “lead user” approach. This is because lead users typically only search and identify areas where innovations are required, while modern toolkit-innovators search, identify and above all develop and design innovations together with manufacturers.⁹⁴

Problem solving as well as innovation processes generally involve many cycles of trial and error, which allow for learning and constant improvement.⁹⁵ Therefore, well functioning toolkits should allow users to run such cycles of trial and error. Furthermore, toolkits need to give users an adequate solution space which does not restrict users’ creativity, while ensuring product producibility. In addition toolkits need to be user-friendly and providers should make sure that users won’t have difficulties in handling and working with the provided applications. This does not only involve user-friendly interfaces but as well libraries containing commonly used elements and modules, which can be embedded into new creations.⁹⁶

The use of VWs as a globally connected platform to integrate users along the entire innovation process in the case of ABIPs, makes it obvious that VWs are used as a modern and new toolkit which allows for an unprecedented form of web based collaboration, which will be further discussed in chapters 6 and 7. After having explored the second dimension of ABIs, chapter 4 will now focus on the third core element of ABIs namely the environment in which this new form of innovation process takes place, namely VWs.

⁹⁴ Von Hippel (2005), p.147.

⁹⁵ Hoyer et al. (2010), p.291.

⁹⁶ Von Hippel et al. (2002), p.825.

4. Virtual Worlds – The Home of Avatars

Virtual Worlds are virtual representations of real or imaginary 3D spaces.⁹⁷ They are crafted places, located inside computers, designed to accommodate large numbers of people⁹⁸ which allow real time user interaction.⁹⁹ Unlike in virtual game worlds there are hardly any restrictions or rules influencing the way users behave or interact with each other. The resulting flexibility and interaction possibilities encountered in VWs make them especially interesting for corporate use.¹⁰⁰ An important difference between VWs and traditional web sites lies in the fact that the entire content of VWs can be updated, created and maintained by individual users. Moreover, most of the time, users provide personally created content to others free of charge and in an altruistic manner, as discussed in the previous chapter.¹⁰¹ VWs are generally accessible over the Internet. Therefore, users can log-in from any computer with Internet connection, even from the most remote areas of our planet. Once the user is logged-in he or she has been given a synthetic body, an avatar. The computer screen basically becomes the eyes of the synthetic body, allowing direct access from someone's real home and renders the VW as it would be perceived if the user would walk through the VW himself.¹⁰² The VW can look very similar to reality, like Mars, Jupiter or Saturn. It might contain settings that look like a fairyland, North Pole, a desert, heaven, hell or simply like anything you can imagine. It might be inhabited by snakes, lions, dragons, dinosaurs, chickens or people. There might be palm-trees, trees, bushes or flowers. There might be houses, tents, caves or igloos and characters might move around flying, jumping, through teleportation or by using cars, ships, flying carpets or spaceships.

If someone is glancing at you in a VW and you glance back, well than the two of you are actually looking at each other through your computer screens although you might be located in Vienna while the other person might be sitting in front of her computer in Sydney. Any communication or even friendship you are going to have with this person as well as the genuine feelings involved with such a relationship, are no different from the ones you would

⁹⁷ Brown et al. (2011), p.7

⁹⁸ Castronova (2005), p.4.

⁹⁹ Kaplan et al. (2009), p.565.

¹⁰⁰ Kaplan et al. (2009), p.565.

¹⁰¹ Kaplan et al. (2009), p.565.

¹⁰² Castronova (2005), p.6.

experience in reality, with the little exception that everything takes place in a VW.¹⁰³ Thus, although the physical environment is entirely computer-generated the human social environment of VWs is no different from reality.¹⁰⁴ This fact is one of the main reasons why VWs are becoming more and more important for socializing purposes and should thus be taken seriously because events that happen inside VWs have effects on the outside world. These spill-over effects are not only visible when it comes to human-interaction but above all when it comes to business, which will be at the heart of chapter 5. VWs are entirely crafted and fantasy-like places shared by millions of people worldwide that generate real inside-to-outside patterns of influence, which function like a frontier between the cyberspace and reality, where the “here” influences the “there” and vice versa.¹⁰⁵

Today’s understanding of virtual reality (VR) and VWs differs greatly from the early days of VR. This fact is caused by two completely different approaches, the scientists approach and the gamers approach. Furthermore, VWs are the result of two important socio-technical phenomena, namely online gaming and social-networking. VWs, online games and social networking sites are all part of Social Media.¹⁰⁶ Figure 4.1 provides an overview over the developments which were crucial for the creation of VWs, and which will be focused on, in more detail, in the following.

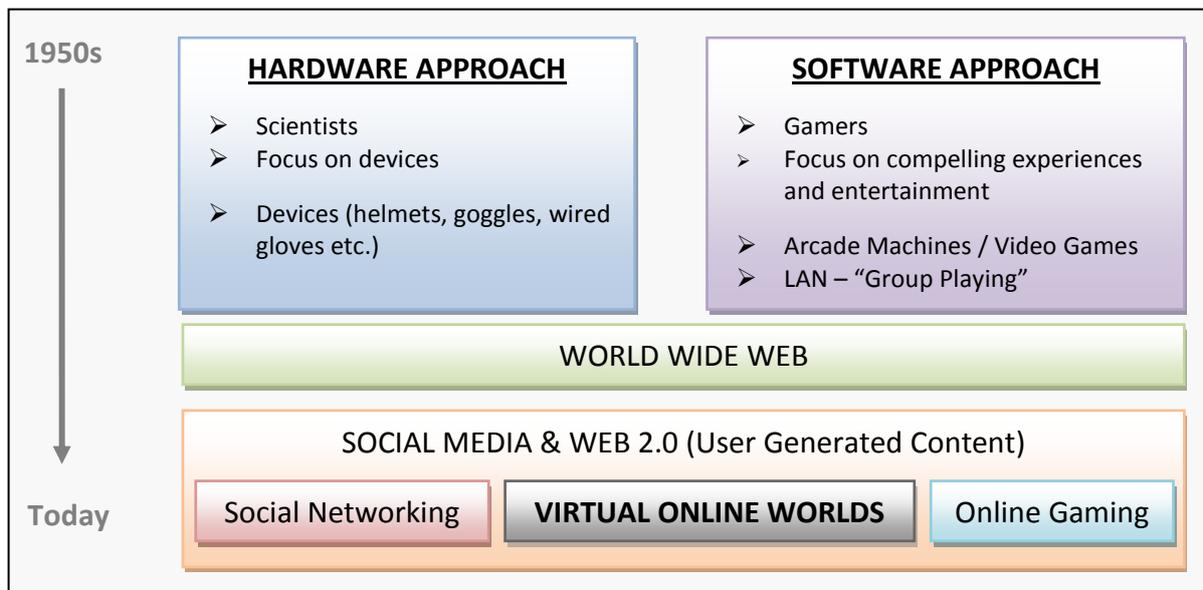


Fig. 4.1: Overview – Historical Developments leading to the Creation of VWs

¹⁰³ Castronova (2005), p.6.

¹⁰⁴ Castronova (2005), p.7.

¹⁰⁵ Castronova (2005), p.8.

¹⁰⁶ Messinger et al. (2009), p.2.

4.1. Important Developments and Milestones

4.1.1. The early Days of Virtual Reality

In the 1950s and 1960s pioneers such as Dr. Ivan Sutherland envisioned that computers would be able to create sensations that would seem “real” to their recipients although they would be only “virtually real” as they were generated by computers.¹⁰⁷ Sutherland is an American computer scientist who was awarded the Kyoto Prize in 2012 in the category of Advanced Technology for his groundbreaking achievements in the development of computer graphics and interactive interfaces.¹⁰⁸ In the beginnings of VR, scientist were primarily working on ways to use the computer in order to create an artificial sensory environment that was aimed to trick the user into believing that the computer-generated and portrayed environment was reality. Thus, in those times a typical day of scientists would involve a laboratory where *“...a subject might have heavy goggles mounted on her head, while images of the Martian landscape being beamed directly into her eyes; she might have her hand in a wired glove-and-arm apparatus that transmitted her motions into the motions of some kind of virtual arm; she might be sitting on a chair that would veer and pitch and roll in the same way as the virtual vehicle she was pirating.”*¹⁰⁹

Scientists were consumed with refining and controlling sensory-input hardware from the outside. A lot of time and resources were invested to reduce the clumsiness of the gear being used, leading to the following general vision of VR: *“...a single person in a special room, wearing a big helmet, her arms and legs wired up to something mobile”*¹¹⁰. There was a clear distinction between what was “real” and “virtual” as scientists shared the basic assumption that the computer-generated world was fake and that it has less actuality and less genuineness compared to content from the real world.¹¹¹ Scientists believed that when a person put the helmet on, they had become “immersed”. Although, this seems highly unlikely as it’s hard to believe that the test subject standing in the lab ever lost consciousness of the fact that he or she was actually still standing in a lab.

¹⁰⁷ Castronova (2005), p.285.

¹⁰⁸ Kyoto Prize, Retrieved on January 3rd, 2013 from <http://www.kyotoprize.org/en/28k-laureates-a.html>.

¹⁰⁹ Castronova (2005), p.285f.

¹¹⁰ Castronova (2005), p.286.

¹¹¹ Castronova (2005), p.288.

Immersion, as already shortly discussed in section 2.4.2, can generally happen in one of two ways, either the sensory inputs are so good that you actually think the computer generated environment is real or you become so mentally and emotionally involved in the VW that you stop thinking about what is real and what is not.¹¹²

While in the early days of VR scientists focused on the first way of immersion by influencing a person's experience from the outside through improving the hardware devices aimed to trick someone into believing that the computer generated experience was real, the game designers took a completely different approach to VR. An approach that is rooted in the second type of immersion and the idea of building VR around the willingness to participate by creating a VW that is highly compelling, fantasy-like, interesting, entertaining and simply fun. The game perspective focuses on the player's subjectivity and well-being and sees entertainment as the key ingredient for the future of VR.¹¹³ Gamers focused on software rather than hardware devices and thus the gamers' perspective involves controlling a VW from the inside rather than from the outside, compared to the traditional scientist-understanding of VR. In addition gamers focus on communities and not only on individuals. They were primarily interested in questions such as: How should monsters and other characters act, while keeping the player involved in the whole scene? What kind of rewards does a user want in order to find the place valuable enough to return? What kind of avatars do people want to see themselves in?¹¹⁴ Furthermore, gamers focused on developing faster graphics, faster networks, better artworks, better communication applications and on making more interesting stories in order to improve the users in world experience.¹¹⁵

Thus, while funded research remained devoted to sensory-input hardware, gamers focused on the inside of VWs, the underlying software, user's experience and willingness and thus on mentally and emotionally engaging software from the very beginning on.¹¹⁶ Therefore, VWs as we know them today were not created by funded researchers but by people tinkering in basements and garages trying to create an environment that was each

¹¹² Castronova (2005), p.5.

¹¹³ Castronova (2005), p.289f.

¹¹⁴ Castronova (2005), p.291.

¹¹⁵ Castronova (2005), p.292.

¹¹⁶ Castronova (2005), p.289.

time just a little more fun than the last time.¹¹⁷ Having said this, it can be concluded that today's VWs were being pulled by the commercial market for games and not pushed by research labs.¹¹⁸ Moreover, history showed that the immersion-approach, focusing on the way humans are made and especially on emotions and entertainment, is much more successful. Another reason further supporting the software approach is the fact that it is cheaper to write a game, compared to the financial means required to design and build compelling hardware devices. After having compared the hardware and the software approach, the following section will now take a closer look at online gaming.

4.1.2. Online Gaming

Countless innovations in technology, devices, hardware and software over the past decades have formed the gaming industry into an extensive network of gaming companies together pulling in USD 25.1 billion in global sales in 2011¹¹⁹ (USD 15.90 billion in content sales, USD 6.29 billion in hardware sales and USD 2.94 billion in accessories sales).¹²⁰ This story of success can be partly attributed to improvements in console technologies as well as to changes in how, where and with whom people play games.¹²¹

Games can have different dimensions of content allure such as strategic and tactical object oriented problem solving, thematic and fantasy role-playing and reflex testing oriented games using special purpose interfaces.¹²² Milestones in the gaming industry include the progress *"...from bulky coin operated arcade machines, to much smaller console systems for the home, to single-person applications on mainframe and personal computers, to local area networks, and finally to the Internet."*¹²³

As game consoles became smaller and more affordable people started to play video games in their homes either alone or together with friends. With the development of Local Area Networks the possibility of playing in groups emerged, allowing large-scale social interaction through gaming. Advancements in personal computing, 3D animation and the

¹¹⁷ Castronova (2005), p.291.

¹¹⁸ Castronova (2005), p.285.

¹¹⁹ ESA – Sales Report (2011), p.16.

¹²⁰ Messinger et al. (2009), p.205.

¹²¹ Messinger et al. (2009), p.205.

¹²² Messinger et al. (2009), p.205.

¹²³ Messinger et al. (2009), p.205.

rapid development of the Internet led to releases such as the *PlayStation2* in 2000, *PlayStation3*¹²⁴ in 2006 and *Microsoft's Xbox 360*¹²⁵ in 2005 (both *Sony* and *Microsoft* announced that they will release the next generations of their products at the end of 2013 with the launch of *PlayStation4* and *Xbox One*) allowing gamers to connect to the Internet and to play against other gamers across the world in virtual 3D spaces.¹²⁶ Compared to early games, like *Super Mario* in which players had to follow predetermined paths, over time games became less structured environments offering players more freedom and the possibility to create their own content e.g. personalized avatars.¹²⁷ A milestone in this regard was the release of one of the most successful games of all times *The Sims* and its sequels (*The Sims2*, *The Sims3*) and spin-offs (*The Sims Online*, *The Sims Stories*, *My Sims*, *The Sims Carnival*, *The Sims Medieval*, *The Sims Social*...). Although, the idea of user generated content was not entirely new when *Electronic Arts* first released *The Sims* in January 2000, the immense success of this game can be traced back to the fact that players are provided a great deal of freedom and control over their environment allowing them to create their own content, e.g. skins and outfits for their avatars, new types of decor for their homes and new pieces of furniture.¹²⁸ The more content users generate individually, the more involved they become in a game leading to the fact that it becomes hard to separate the game from its players and vice versa as neither the game nor its players can be fully understood without studying the other. Therefore, a symbiotic emergence of culture and content can be observed just as in real social systems and this phenomenon is also true for VWs.

Today probably the most important segment of online distributed games is made up by the so called *Massively Multi-Player Online Role-Playing Games* (MMORPGs). In MMORPGs thousands of users interact with one another, many hours per day, in the guise of video game characters.¹²⁹ Examples for such worlds include *World of Warcraft*, *Guild Wars 2* or *Eve Online*. Although, gamers are given a great deal of freedom in these worlds, e.g. avatars can typically wander where they wish from the very beginning on, MMORPGs still follow the tradition of early electronic games in which challenges and designer intended objectives

¹²⁴ Wikipedia Playstation, Retrieved on July 14th, 2013 from <https://de.wikipedia.org/wiki/PlayStation>.

¹²⁵ Wikipedia X box 360, Retrieved on July 14th, 2013 from http://de.wikipedia.org/wiki/Xbox_360.

¹²⁶ Messinger et al. (2009), p.205.

¹²⁷ Messinger et al. (2009), p.205.

¹²⁸ Messinger et al. (2009), p.205.

¹²⁹ Castronova (2005), p.1.

have to be fulfilled to advance and grow, e.g. avatars can gain skills or the right to enter restricted areas through earning experience points by participating in challenges and contests.¹³⁰ Moreover, in virtual game worlds, predefined rules guide and govern the behavior of avatars, e.g. you need to be a wizard to perform magic or a cleric to help others in *Sony's EverQuest*.¹³¹ In addition in virtual game worlds avatars are most of the time not allowed to engage in economic activities with others, unlike in VWs.¹³² Similar to games with user-generated content, in the more purpose-driven worlds of MMORPGs the players' freedom and possibility to interact with each other reveal at the same time social challenges and benefits rooted in the cultural differences of users.¹³³

The distinction between VWs and online games is a bit blurry as both have similar features and purposes. However, there is no doubt about the fact that the developments of the electronic gaming industry, including user controlled avatars, multi-user interaction, 3D animation, user-generated content and MMORPGs led to important socio-technical innovations that set the stage for and became incorporated within VWs.¹³⁴ The following section will focus on another key development that influenced VWs, namely on Social networking applications.

4.1.3. Social Networking

Although, Social networking (SN) is nowadays equally popular as online gaming it is a much more recent phenomenon. The first social networking application *SixDegrees.com* was launched in 1997. Since their emergence, social networking platforms have expanded and enlarged their features in interesting ways leading to the fact that overall membership has grown dramatically.¹³⁵ The core features of social-networking web sites include the easy creation of profiles, stating personal information about members and the possibility to define a circle of trusted friends which offers members the possibility to grant only certain friends the right to access private information.¹³⁶ Most SN profiles can contain not only textual and pictorial information but as well audio and video content. Furthermore, SN sites

¹³⁰ Messinger et al. (2009), p.205f.

¹³¹ Kaplan et al. (2009), p.566.

¹³² Kaplan et al. (2009), p.566.

¹³³ Messinger et al. (2009), p.206.

¹³⁴ Messinger et al. (2009), p.206.

¹³⁵ Messinger et al. (2009), p.206.

¹³⁶ Messinger et al. (2009), p.206.

encourage communication between members through media applications such as blogging, instant messaging and chats as well as notifications about recent updates of a friend's profile, automatic friend suggestions, and content reviewing, commenting and tagging options.¹³⁷ Thus, SN sites combine most elements that are commonly known under the term "Web 2.0 Technologies". Another important feature of SN sites is that they require no technical expertise and can be thus easily handled by their users giving them the freedom to socialize and to share content¹³⁸.

The wide range of SN sites can be categorized depending on their target group or special purpose. Some SN sites aim for members within a specific geographic location. For instance *Cyworld* was originally launched in South Korea, serving the specific cultural peculiarities such as language and etiquette. Other SN sites are specifically designed for certain demographic profile groups such as *Neopets*. *Facebook* was originally designed and launched exclusively for Harvard students, although it is now available around the globe. Again other SN sites were created to support a particular activity or theme such as *Youtube* in order to share video files and some SN sites were launched with the purpose of delivering a traditional service via the Internet such as *LinkedIn* and *Xing* to establish professional networks. Finally some SN sites were developed for niche groups with particular interests and beliefs as other SN sites simply did not meet their needs.¹³⁹

Just as with online gaming there is no doubt about the fact that the emergence of social networking sites led to important innovations and practices that have become adopted within and set the stage for VWs. These innovations and practices include easily created profiles containing text and pictures as well as audio and video content, the possibility to create a circle of trusted friends, communication elements such as blogging, instant messaging, chats, notifications, introductions, content reviewing and SN sites for various social target groups.¹⁴⁰

¹³⁷ Messinger et al. (2009), p.206.

¹³⁸ Messinger et al. (2009), p.206.

¹³⁹ Messinger et al. (2009), p.206.

¹⁴⁰ Messinger et al. (2009), p.206.

As shown in figure 4.1 Social Networking, Virtual Worlds and Online Games belong all to the larger group of Social Media and Web 2.0 applications. Thus, the following section will take a closer look at the term Social Media.

4.1.4. The Age of Social Media

The term social media is typically used to describe the wide range of Internet based applications that allow users to share ideas, opinions, insights, experiences etc. and to connect with each other using the different forms of new media and technologies nowadays available over the World Wide Web.¹⁴¹ When dividing the term “social media” into its component parts, the meaning of the term becomes even clearer. While "social" represents the human basic need to get in contact and to connect with other human beings via some type of communication, “media” refers to the different ways of how people connect with each other, and can thus be seen as the connection device used to get in touch with another person.¹⁴² In this sense the term combines content communities such as *YouTube*, social networking sites or blogs like *Facebook*, collaborative projects such as *Wikipedia*, VWs such as *Habbo*, *Kaneva* or *Next Island* and multi-player online games such as the very popular *FarmVille*. Although, it should be mentioned that compared to traditional MMORPGs, social media games put socializing activities in the foreground, while gaming is only of secondary importance and comparatively less time-intensive.

The sheer dimensions and importance of social media can be observed by taking a look at some statistics. In early 2010 approximately 3.5 billion messages¹⁴³, links or videos have been uploaded to *Facebook* per week and as of October 2012 *Facebook* registered about one billion monthly active users.¹⁴⁴ Similarly, as of March 2012, more than 340 million tweets were sent via *Twitter* per day.¹⁴⁵ These numbers prove that the information flood reaches new heights in the age of social media and ranges from *Wikipedia* entries to private chat rooms, from sharing photos or other files via sharing platforms to video tutorials on *YouTube*, or from reporting or tweeting about a natural catastrophe to discussions about the use and risks of nuclear energy taking place in a virtual world conference room.

¹⁴¹ Kaplan et al. (2009), p.565.

¹⁴² Safko (2010), p.3.

¹⁴³ Bernet (2010), p.9.

¹⁴⁴ Facebook – Newsroom, Retrieved on January 6th, 2013 from <http://newsroom.fb.com/Key-Facts>.

¹⁴⁵ Twitter-Blog, Retrieved on January 6th, 2013 from <http://blog.twitter.com/2012/03/twitter-turns-six.html>.

Social media is said to be still in its infancy. From today's perspective, it is therefore difficult to predict where this trend will lead. Today's position and progress of social media is comparable to the progress of the radio in the early 20th century, television in the 1950s or the Internet in 1995.¹⁴⁶ Nobody but people and their need for information exchange will determine how the social media will evolve. Perhaps the term "social media" will have disappeared in 15 years and instead something new will take its place, but what will definitely remain is a fundamental change of how communication is done. A change leading away from media monologues such as in the case of radio and television and towards social media dialogues.¹⁴⁷ Via the social media, information transmitters and receivers are placed at the same level, encouraging participation and dialogue. In this sense social media applications contribute to the democratization process of knowledge and information sharing, just as user introduced innovation processes represent a democratization of the innovation process as discussed in chapter 3. This is because users get the opportunity and the right to be not only consumers but as well to produce and publish their own data, content and information.¹⁴⁸ After a short review of the most important developments that led to the creation of VWs, section 4.2 will now focus on VW-Types and target groups.

4.2. Types and Target Groups of Virtual Worlds

Data on the main target groups of VW-users suggests that more than 70% of all VW-users are mainly participating in VWs devoted to entertainment and gaming as illustrated in figure 4.2.

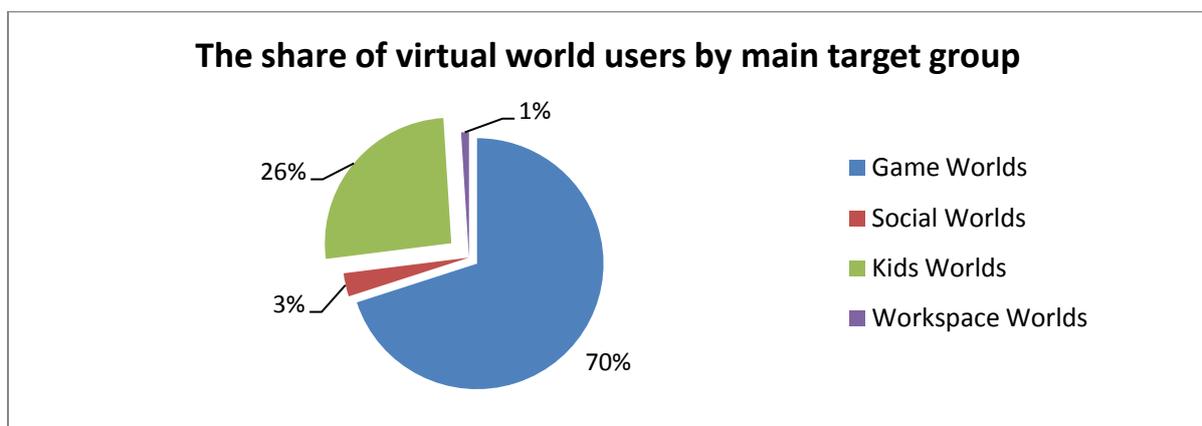


Fig. 4.2: The share of Virtual World Users by main Target Group
(Own illustration based on: OECD (2011), p.9.)

¹⁴⁶ Bernet (2010), p.9.

¹⁴⁷ Brennan (2010), p.8.

¹⁴⁸ Wikipedia – Social Media, Retrieved on January 6th, 2013 from http://de.wikipedia.org/wiki/Social_Media.

However, the percentages, shown figure 4.2 should be carefully interpreted as the majority of VWs offer besides entertainment as well other applications. Therefore, while some users play and have fun, other users might participate in lectures, simulations or may use VWs to do research. The second largest target group, are Kids Worlds with about 26% followed by virtual worlds exclusively devoted to socializing and workspace worlds.

Figure 4.3 shows the number of average hours spent in VWs by age class and gender. The graph shows that boys up to 17 years and women older than 35 years spend on average more than 25 hours per week in VWs. Furthermore, while the number of average hours spent in VWs decreases for both genders till the age of about 23, it remains low for men older than 23 years and starts to rise again for women aged older than 23 years.

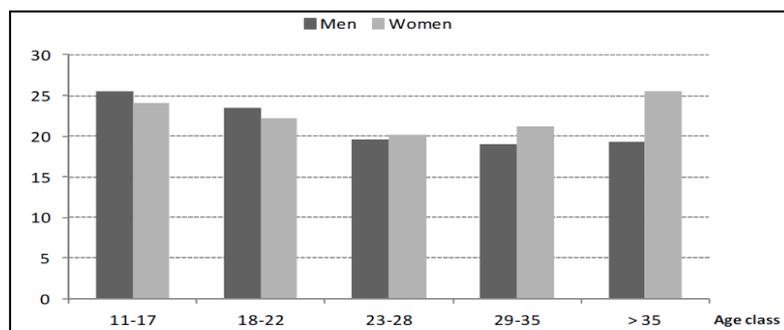


Fig. 4.3: Average hours spent in Virtual Worlds by Age Class and Gender
(Source: OECD (2011), p.9.)

Moreover, when taking a look at the KZERO-Worldwide Universe Charts illustrated in figures 4.4 and 4.5 two more important things become immediately obvious to the interested observer. First, there is a vast amount of VWs available. Second, about $\frac{3}{4}$ of all VWs have a target group, aged not older than 15 years.

With roughly 33.7 million registered users as of May 2013, *Second Life* is by far not the biggest VW in terms of residents.¹⁴⁹ Nevertheless, *Second Life* remains the number one VW when it comes to newspaper coverage due to the fact that it is one of the most popular VWs for adults with a flourishing economy offering great opportunities. Among the biggest VWs mainly children and teen-VWs can be found, such as *Habbo*, a social networking online world owned by the Finnish *Sulake Corporation* with about 273 million registered users as of August 2012, as illustrated in figure 4.4.¹⁵⁰

¹⁴⁹ Second Life Grid Survey, Retrieved on May 14th, 2013 from <http://www.gridsurvey.com/>.

¹⁵⁰ Sulake Company, Retrieved on May 14th, 2013 from <http://www.sulake.com/habbo/>.

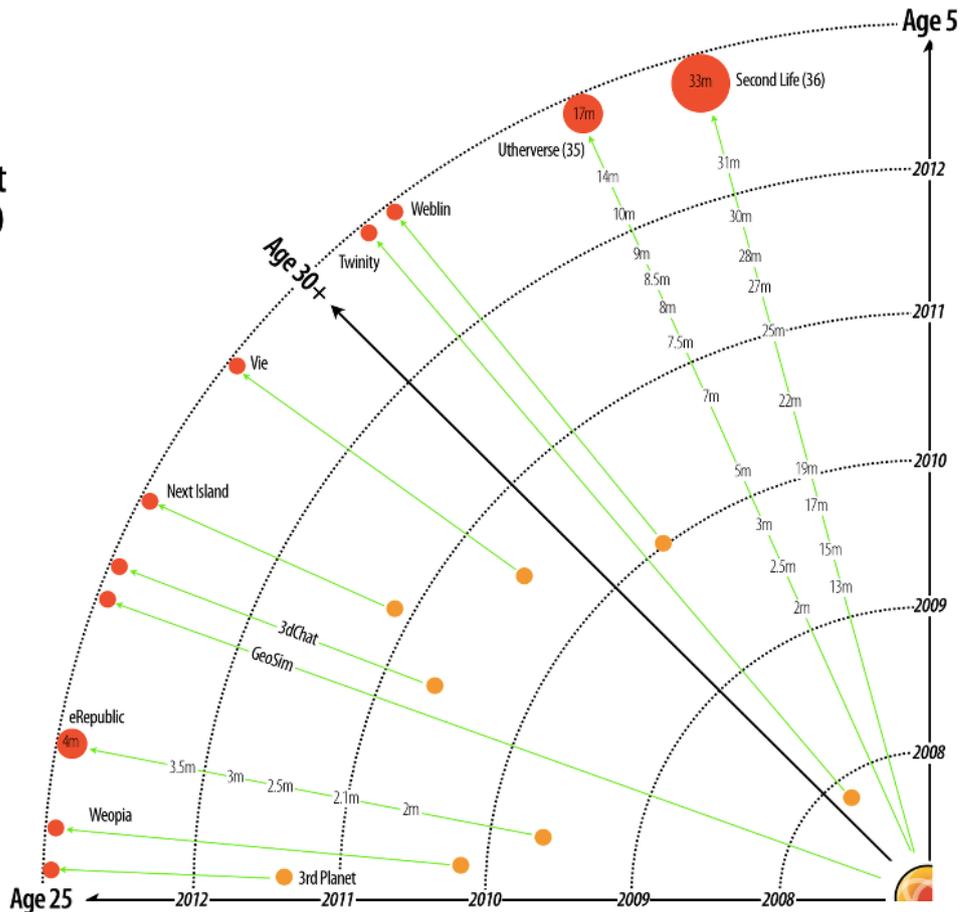


KZero Universe Chart Virtual World / MMO Registered Accounts Q4 2012

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- Live or open beta
- Launched in

No data shown for worlds under 1m registered accounts.
Includes estimates.
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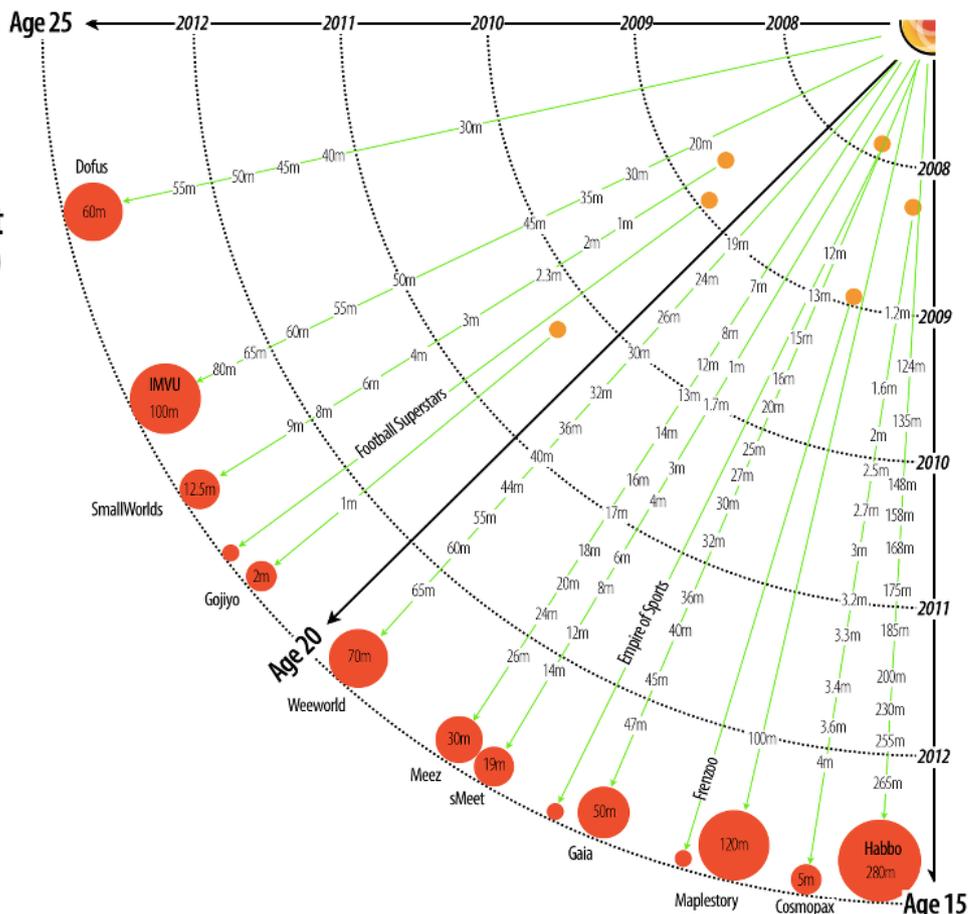


Fig. 4.4: Virtual World Universe – Part 1
(Source: KZERO-Worldwide)

A mixture of MMORPG and VW is *Disney's Club Penguin* with about 220 million¹⁵¹ users as of late 2012.¹⁵² In *Club Penguin* users can participate with their penguin-avatars in games taking place in comic-like settings and socialize with other players. With over 200 million¹⁵³ users the Swedish VW *Stardoll* is as well placed among the most popular virtual worlds for teens, offering residents the possibility to play with dolls and dress them up. Furthermore, *Poptropica* with about 265 million¹⁵⁴ registered users and *Neopets* with 77 million¹⁵⁵ users belong as well to the group of VWs which are very popular in kid and teen circles, as illustrated in figure 4.5. *Poptropica* is a VW offering gaming and socializing possibilities¹⁵⁶ while in *Neopets* residents can hold, play with and take care of online pets.¹⁵⁷

The fact that the majority of VWs is targeting young people holds valuable information about the growth potential of VWs. This is because users who became familiarized and used VWs already in their childhood, will be more willing to incorporate VWs as well in their everyday life once they reach adulthood. Just take a look at today's generation of digital natives aged between 15 and 25, who grew up with the Internet and personal computers. Can you image them running around without smart phones, tablets, laptops, net books etc. offering them the possibility to connect themselves with the World Wide Web at any time? Similarly it is very likely that people who grew up with VWs will continue to participate in VWs for socializing as well as business, work-related, entertainment, or educational purposes.

The entity of VWs, depicted in figures 4.4 and 4.5 can be divided into five major classes including theme-based, community-specific, children focused, education focused and self determined VWs.¹⁵⁸ Theme-based VWs usually focus on a specific content, or genre such as TV series, fashion and lifestyle, movies, books, sports or music genres. Similar to theme – based VWs, community specific VWs focus on a particular community e.g. people from a specific geographical region or a religious group sharing the same characteristics and

¹⁵¹ KZERO – Worldwide Virtual World Universe Charts (Fig. 4.4 and 4.5).

¹⁵² Wikipedia – Club Penguin, Retrieved on May 14th, 2013 from http://en.wikipedia.org/wiki/Club_penguin.

¹⁵³ KZERO – Worldwide Virtual World Universe Charts (Fig. 4.4 and 4.5).

¹⁵⁴ KZERO – Worldwide Virtual World Universe Charts (Fig. 4.4 and 4.5).

¹⁵⁵ KZERO – Worldwide Virtual World Universe Charts (Fig. 4.4 and 4.5).

¹⁵⁶ Wikipedia – Poptropica, Retrieved on May 14th, 2013 from <http://en.wikipedia.org/wiki/Poptropica>.

¹⁵⁷ Wikipedia – Neopets, Retrieved on May 14th, 2013 from <http://en.wikipedia.org/wiki/Neopets>.

¹⁵⁸ Messinger et al. (2009), p.207.

interests. Children focused VWs, such as the previously mentioned examples of *Habbo*, *Club Penguin*, *Stardoll*, *Neopets* or *Poptropica*, focus mainly on gaming, toy and fantasy worlds, role-playing and socializing. Education focused VWs typically offer training and learning possibilities in areas such as skill development, architecture, design or language learning. Finally self determined worlds, such as *Second Life*, typically don't follow a specific purpose and thus allow resident to engage in a very wide range of activities.¹⁵⁹ The fact that *Second Life* belongs to the group of self determined VWs, which allow for content creation, creativity and a very high degree of freedom, contributes to the fact that it is one of the most popular VWs for adults and makes it highly interesting for corporate use and thus as well for collaboration and innovation projects.

4.3. Popularity of Virtual Worlds among Kids

The fact that the majority of VWs are game worlds, targeting primarily children, raises the following questions: How popular are Virtual Worlds among children? How often do children use Virtual Worlds in comparison to other popular devices? Do children (or their parents) spent money in Virtual Worlds?

A survey, conducted on July 17th 2013, was aimed to provide answers to the previously presented questions. This survey was held during a special lecture with the title: "How much does your journey into a virtual Kids-World cost?" This lecture took place during the 11th annual Children's Summer University in Vienna. A total of 110 children, 40 girls and 70 boys, participated in the lecture and the survey. All in all 101 questionnaires have been returned which translate into an excellent response rate of 92%. All participants were aged between 7 and 12 years as illustrated in figure 4.6.

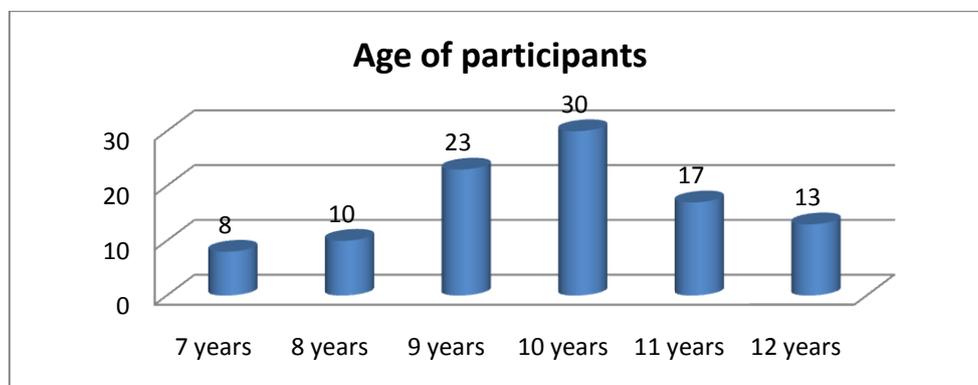


Fig. 4.6: Age of Participants

¹⁵⁹ Messinger et al. (2009), p.207f.

The results of the survey supported the previously gained impression that children are indeed very well familiar with VWs. 66% of all participants stated that they play at least once per month in a VW. Among the children’s favorite VWs one could find very popular VWs such as *Club Penguin*, *Minecraft* and *Stardoll*. In fact the median-use of VWs, among the survey-participants, is once per week. In comparison the median use of handhelds and consoles is only once per month and the majority of all participants stated that they never use tablets at all. Furthermore, only 10% of all participants stated that they never use a computer and 34% stated that they never use a Smartphone. Moreover, 81% of all participants stated that they never spent money in VWs, while 8% stated that day spent less than € 5,00 in VWs and 5% stated that they spent more than €50,00 in VWs. Additional information on the popularity of VWs in comparison to other gaming devices is provided in the figures 4.7.

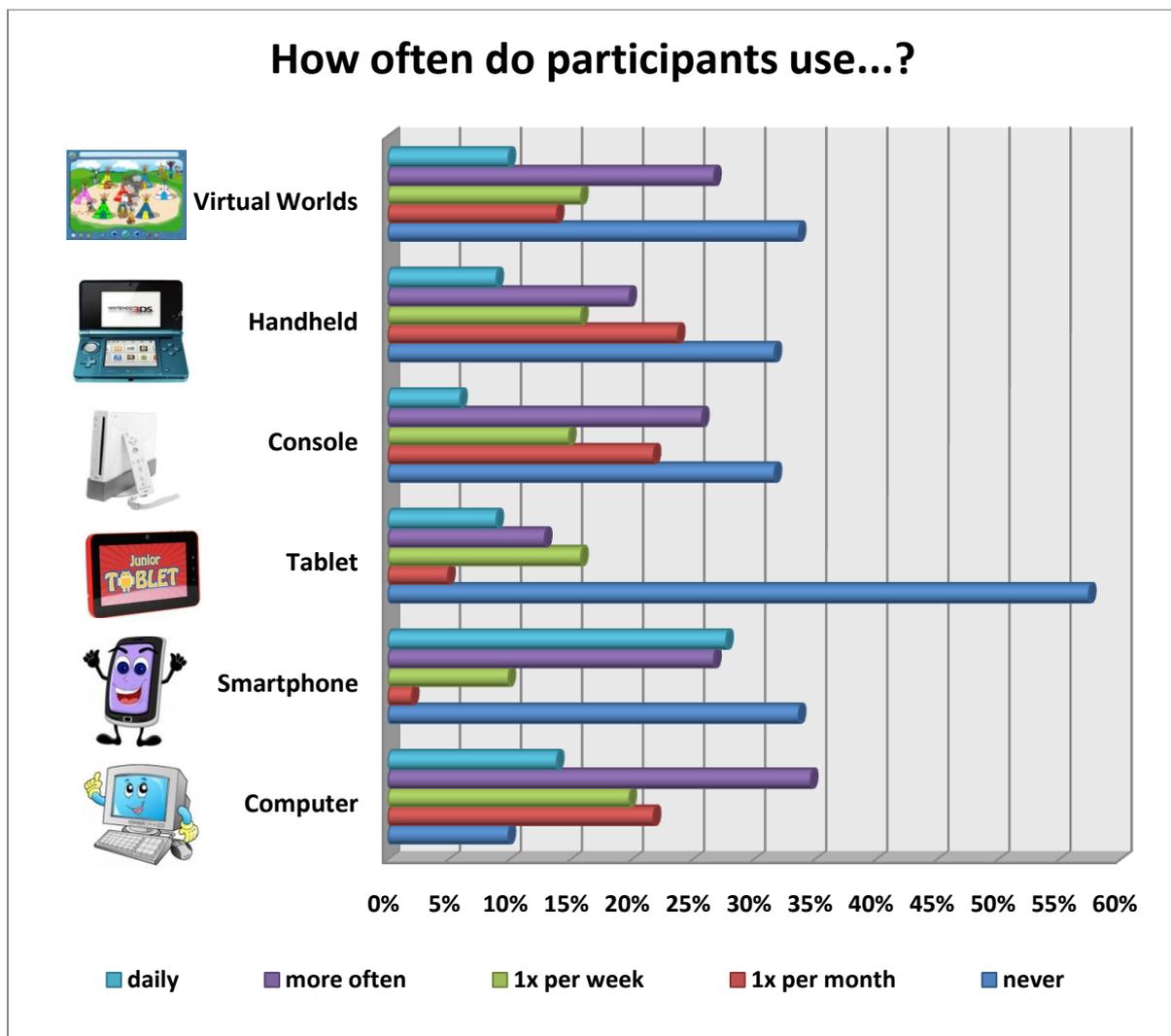


Fig. 4.7: How often do Participants use VWs in comparison to other Gaming Devices?

If one would rank the different devices, based on their use and thus their popularity among children, VWs would place 3rd behind smartphones on the first place and computers on the second place, and before consoles on place four, handhelds on place five and tablets at the end of the ranking. Figure 4.8 shows the median popularity of the compared devices.

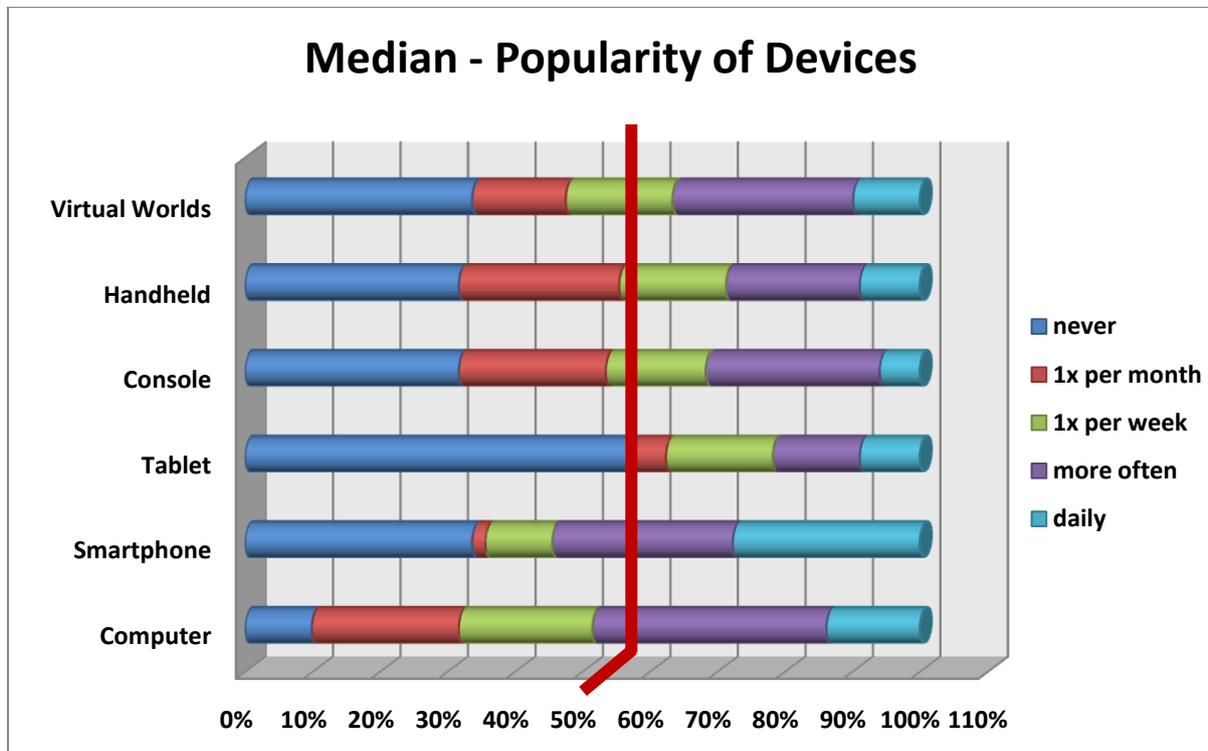


Fig. 4.8: Median-Popularity of Gaming Devices

Additional survey results regarding the popularity of VWs among children as well as exact values and further statistics are provided in Appendix A.

4.4. Culture in Virtual Worlds

People with different cultural backgrounds have diverse values inculcated by growing up in different cultures. Therefore, they think and behave according to what their own societies dictate.¹⁶⁰ Furthermore, they see the world through different lenses depending on the individual person's cultural history and traditions. Yet in VWs, people from all over the world and with different cultural backgrounds, come together on an everyday basis.¹⁶¹ This implies that VWs must allow for cultural diversity and richness, e.g. when it comes to the design of VWs.

¹⁶⁰ Deal et al. (1999), p.160.

¹⁶¹ Badler (1997), p.4.

Culture according to *Hofstede* can be defined as the entity of *symbols, heroes, rituals* and *values* shared by a group of people.¹⁶² *Symbols* such as words, language, gestures or objects have a particular meaning, recognized by people sharing the same culture.¹⁶³ *Heroes* are real or imaginary role models, possessing abilities and qualities which are valued within a culture. *Rituals* are collective activities, e.g. ways of greeting, paying respect or religious ceremonies, which are considered to be socially essential. *Values* form the core of culture and guide individual behavior. They function as social rules and are typically acquired early on.¹⁶⁴

Although, some of the visible traits of a person's culture might disappear when users immerse with their avatars into a VW, their individual culture will still be conveyed in the way their avatars behave, engage with others or value certain objects. Therefore, although VW-users might share characteristics such as open-mindedness or free-spirit, there is still potential for cross-cultural misunderstandings, just as in any other situation where people from different cultures come together.

Understanding cultural differences is not only important in terms of getting along, but as well when it comes to the design process of avatars in order to make them more related to individual cultures. For instance a very expressive avatar might be suitable for an American who is used to conveying a lot of emotions but might be too intense for a Chinese or Japanese person.¹⁶⁵ In this context *Hofstede's* five dimensions of national culture¹⁶⁶ can be used as an indicator for cultural similarities and differences.

- **Power distance:** The extent to which less powerful members accept and expect that power, is distributed unequally.
- **Individualism vs. Collectivism:** Personal ties are typically loose in individualistic cultures, while collectivism implies that people are integrated into groups.
- **Masculinity vs. Femininity:** In masculine cultures assertiveness prevails, while a high degree of caring is a characteristic for feminine cultures.
- **Uncertainty Avoidance:** Refers to a societies' tolerance for uncertainty and ambiguity.

¹⁶² Hofstede et al. (2005), p.7.

¹⁶³ Hofstede et al. (2005), p.7.

¹⁶⁴ Hofstede et al. (2005), p.8.

¹⁶⁵ Kleinsmith et al. (2006), p.1373.

¹⁶⁶ Hofstede et al. (2005), p.23.

- **Long term vs. short term orientation:** Long term cultures are future-oriented and value perseverance and thrift, while short term cultures value virtues related to the past and present including traditions, preservation of “face” and the fulfillment of social obligations.¹⁶⁷

Studies of national culture showed especially high power distance scores for Latin, Asian and African countries. In western countries such as the USA, individualism prevails while eastern and less developed countries are dominated by collectivism.¹⁶⁸ Austria, Germany, Switzerland and Japan rank high as far as masculinity is concerned, while Nordic countries rank low and Anglo countries in the middle. Finally uncertainty avoidance scores are high in Latin countries, in Japan and in German speaking countries while long term orientation is mostly found in East Asian countries especially in China.¹⁶⁹

4.5. Gamification and the Experience Economy

Having a memorable experience and engaging avatars through game like applications are important elements of VWs in order to make these virtual places even more appealing and captivating. On the one hand experiences are one of the main motivational drivers for human beings in order to spend time in VWs, as seen in Chapter 2, and on the other hand the gaming industry in general and online games in particular can be seen as the predecessors of VWs as discussed earlier in this chapter. The affect of game-like applications and the possibility to increase product sales by wrapping experiences around traditional products didn't remain unnoticed by the economy. Thus, a whole new type of economy, the *Experience Economy*, emerged. Games, experiences and business transactions are linked together in VWs. Thus, in the following the terms *Gamification* and *Experience Economy* will be further discussed. Chapter 5 will then continue to focus on the business aspects of VWs in more detail.

Gamification is a recent phenomenon and can be defined as “...the use of game design elements in non-game contexts.”¹⁷⁰ E.g. online retailers are increasingly using game-elements such as points, leader boards, or badges as part of their feedback and reward systems to increase customer interaction and sales. Similarly in VWs businesses use games,

¹⁶⁷ Hofstede et al. (2005), p.210.

¹⁶⁸ Kleinsmith et al. (2006), p.1387.

¹⁶⁹ Hofstede (1999), p.17.

¹⁷⁰ Deterding et al. (2011), p.9.

challenges and events to draw customer attention to their virtual stores and to reward avatars with memorable experiences, which ultimately leads to higher brand perception.

As consumers typically desire experiences, companies are increasingly trying to sell their goods and services together with an experience which represents an additional value to customers.¹⁷¹ In the context of the *Experience Economy*, which refers to the trend of wrapping experiences around traditional products and services in order to increase sales. Pine et. al (1998) defined the four realms of experiences, illustrated in figure 4.9. According to this theory products or services are usually accompanied by an experience which falls into one of the following four categories: Entertainment, Educational, Escapist and Esthetic.¹⁷² The different forms of experiences can further be classified along two dimensions, namely the degree of participation and the degree of absorption vs. immersion.

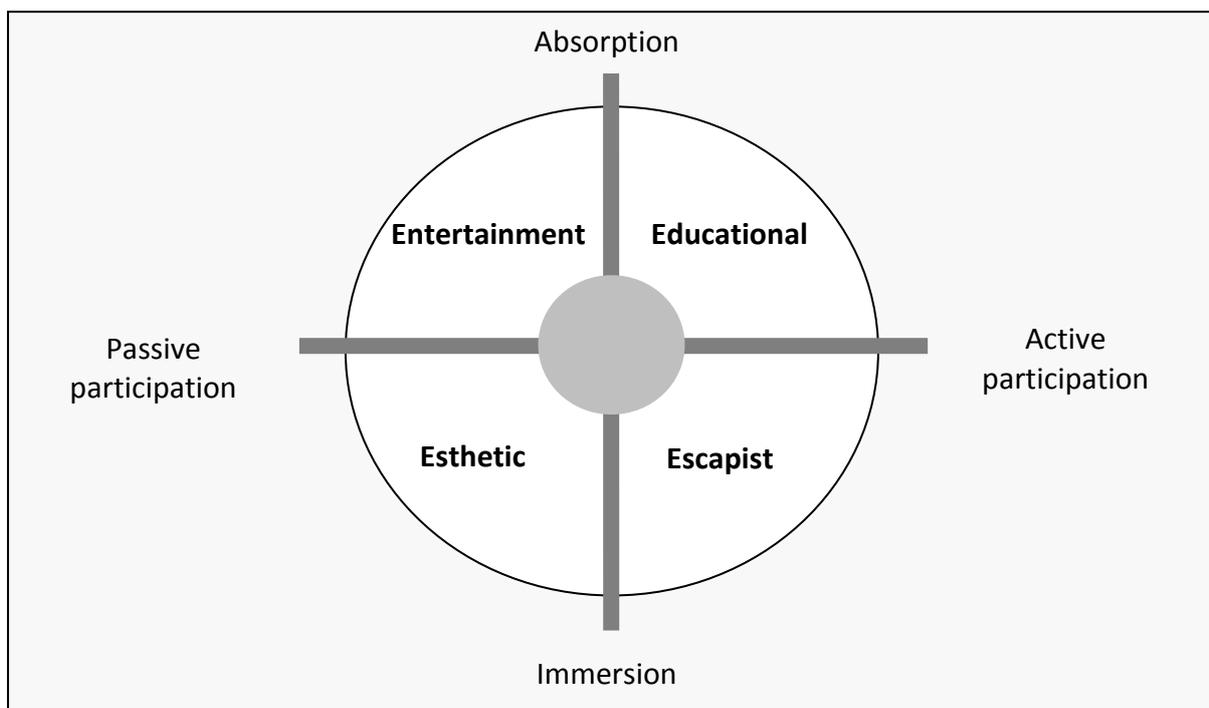


Fig. 4.9: The four Realms of an Experience
(Own illustration based on Pine et al. (1998), p. 102)

Experiences that originate from entertainment such as attending a virtual concert typically involve rather passive participation, compared to experiences which are based on active participation such as participating in a virtual lecture, simulation or training session as in the case of virtual education. Furthermore, entertainment and education are experiences

¹⁷¹ Pine et al. (1998), p.98.

¹⁷² Pine et al. (1998), p.102.

of absorption rather than immersion. Escapist experiences involve a high degree of active participation and immersion. Examples for escapist experiences involve acting in a virtual play or parachuting from a virtual tower. The fourth kind of experiences, namely esthetic experiences, usually allows avatars to immerse into a setting but restricts active participation such as in the case of an avatar visiting a virtual art gallery.¹⁷³

When taking a close look at the different types of experiences it becomes not only obvious that the different types of experiences represent at the same time motivation factors for people to spend time in VWs, as discussed in section 2.4, but moreover it becomes evident that a clear distinction between the different types is difficult. This is because most experiences are made up by not only one of the four different types, but by several. Furthermore, it has been found out that that the richest forms of experiences involve aspects of all four different kinds.¹⁷⁴ After having explored the three core elements of Avatar-based Innovations (Avatars, Innovations and Virtual Worlds) chapter 5 will now continue with an excursus, focusing on the different business opportunities and challenges that can be encountered in VWs.

¹⁷³ Pine et al. (1998), p.102.

¹⁷⁴ Pine et al. (1998), p.102.

5. Excursus: Business in Virtual Worlds

Due to the high degree of freedom, a vast amount of users over the whole world and the sheer seamless technological possibilities, VWs have become considerable business environments. *Second Life's* economy for instance amounted to an equivalent of USD 567 million in 2009 which represented a growth of 65% compared to 2008.¹⁷⁵ More recent figures are not available as *Linden Research Inc.*, the owner and developer of SL stopped to publish economy figures. The very specific and incomparable characteristics of VWs lead to new ways of doing business, including opportunities and challenges which are further discussed in this chapter.

5.1. Business Opportunities

There are several different ways which allow companies to use VWs for business purposes. These include advertising, virtual product sales and marketing research as well as more company-internal activities such as human resources and internal process management.

5.1.1. Advertising

Advertising is among the group of business opportunities probably the most common form of doing business in VWs. Advertising in VWs ranges from setting up virtual flagship stores, over buying space in virtual malls, buying advertising time in virtual radio or television broadcasts, renting billboards on streets to the sponsoring of specific in-world events. Virtual flagship stores are basically digital representations of flagship stores as one would find them in cities like New York, Paris or Tokyo, selling virtual equivalents of actual real life products. *Toyota* for instance has a flagship store in *Second Life* where virtual equivalents of recent models are presented.¹⁷⁶

Buying advertising space in VWs follows the same principles as in the real world with two exceptions, namely it is comparatively much cheaper and it is targeted at a very technology advanced and specific audience. For example when the Canadian *IMAX Corporation* decided to advertise Harry Potter and the Order of The Phoenix in SL they reached a total of 15,000

¹⁷⁵ Wikipedia – Second Life, Retrieved on May 14th, 2013 from http://en.wikipedia.org/wiki/Second_Life#Economy.

¹⁷⁶ Kaplan et al. (2009), p.566.

unique visitors.¹⁷⁷ This advertising campaign was especially promising as the majority of VW-users is young and interested in fantasy like stories and adventure novels like Harry Potter. As far as costs are concerned, the cost-per-thousand clicks can be reduced to about USD 0.15 when advertising in SL, compared to the per-thousand click costs of *Google's Ad Words* which range from USD 1 to USD 8.¹⁷⁸

As the key motivators, to spend time in VWs, include compelling and fun experiences one major element of VWs are events. Companies can use these events in their own favor through supporting them, such as done by *The Guardian* and *Intel* when they sponsored *Second Life's* virtual music festival "Second Fest".¹⁷⁹ When it comes to advertising in VWs companies should also keep in mind that their in-world activities might influence their real-world brands. This influence can be both positive and thus leading to real life press coverage or negatively interpreted, ultimately harming a company's brand.

An example for a company which successfully positioned its brand in a VW is *L'ORÉAL Paris*, as shown in figure 5.1. Together with the Virtual World Research & Advertising specialist *KZERO-Worldwide*, the company launched four virtual make-up looks to apply to an avatar, each featuring a famous actress. These make-up looks were available, for free, in different SL locations, including the stores: Nuclear Boutique, Lassitude&Ennui, Nicky Rees and Minx Shoe designs. The campaign was promoted via in-world product placements, including a supersize Handbag, aimed to catch the attention of curious avatars and billboards. Furthermore, the campaign was also promoted outside of VWs, e.g. as advertisement on SL websites devoted to virtual fashion and clothing and in the form of print ads in SL magazines. The idea to promote this campaign not only in-world but as well in reality made it a successful co-branding strategy spanning from reality to the virtual world.¹⁸⁰ Moreover, by offering make-up looks as freebies, in order to provide users a way to further customize their avatars, the company did not only catch traffic but it demonstrated as well that it understands, values and cares about avatars and the culture and special characteristics of VWs.

¹⁷⁷ Kaplan et al. (2009), p.566.

¹⁷⁸ Kaplan et al. (2009), p.566.

¹⁷⁹ Kaplan et al. (2009), p.566.

¹⁸⁰ De Mesa (2009), p.76.

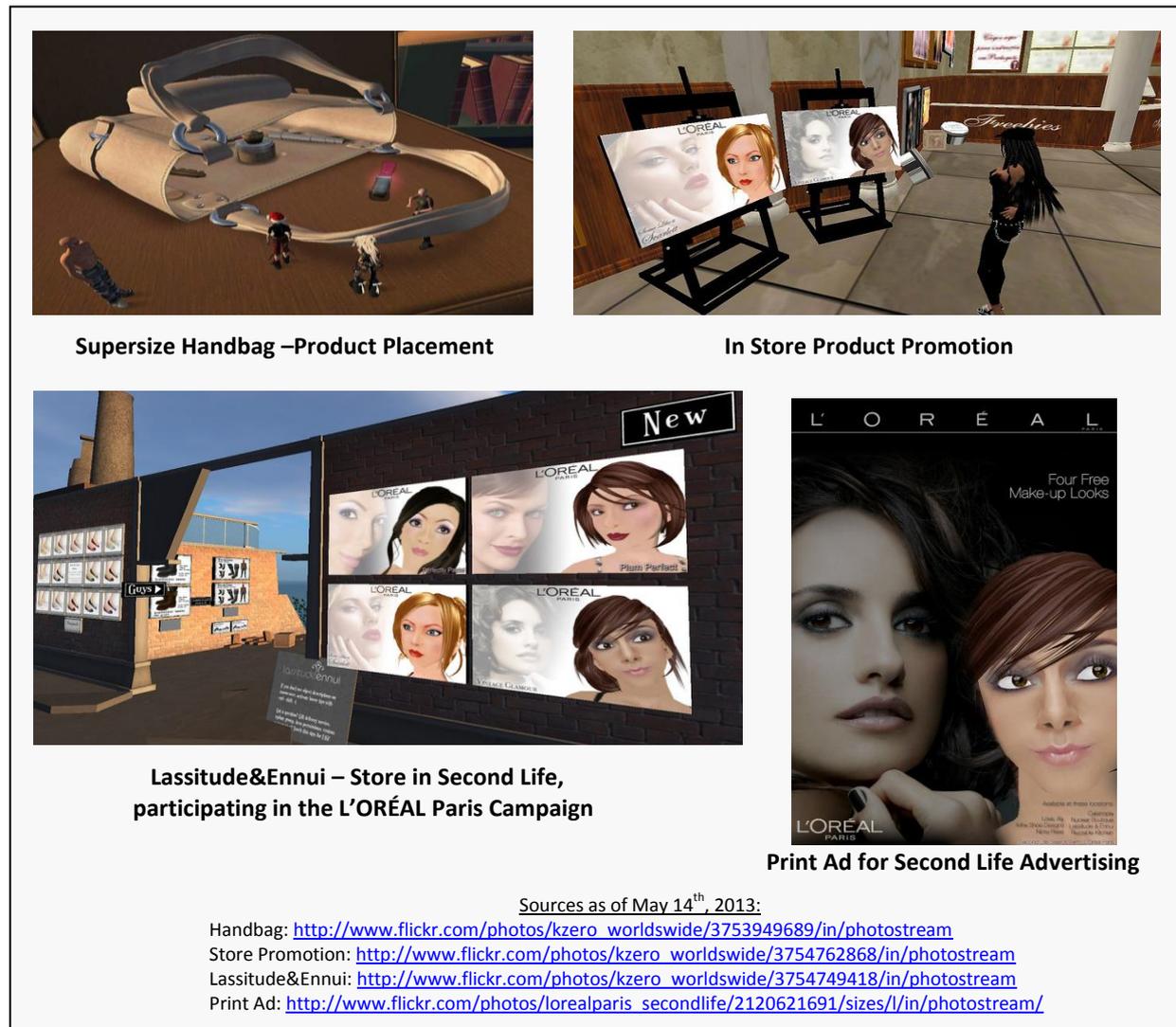


Fig. 5.1: L'ORÉAL PARIS – Advertising Campaign in Second Life

5.1.2. Virtual-Commerce

Virtual-Commerce (V-Commerce) represents the second group of business opportunities in VWs. The most common way of engaging in v-commerce for businesses is to sell digital equivalents of products and services offered in real life stores such as done by *Telecom Italia* and *Endemol*. *Telecom Italia* launched its *First Life Communicator* in SL, enabling avatars to make calls and to send text messages. *Endemol*, a media company placed in the Netherlands, decided to bring their real life reality show *Big Brother* to SL.¹⁸¹

Other companies offer services that create a bridge between VWs and the real world. Examples include the *Deutsche Post World Net* and *Circuit City*. *Deutsche Post World Net* offers avatars in SL the possibility to send virtual post cards which are delivered as real life

¹⁸¹ Kaplan et al. (2009), p.567.

postcards to SL-users around the globe. *Circuit City*, an American consumer electronics retailer sells real life products in its virtual flagship store which are then dispatched as real life items to the user's home.¹⁸² When it comes to v-commerce the possibility of virtually experiencing a product is likely to positively influence a user's attitude towards a product both in the virtual and real world and can thus result in higher sales.¹⁸³ Furthermore, v-commerce has some advantages over traditional e-commerce. These advantages include the fact that products can be presented in much more detail and that social interaction between customers and salespersons is possible.¹⁸⁴ To engage in v-commerce a company first has to set up a corporate presence in a VW, which is in-turn linked to several cost factors typically including a premium membership fee, the cost of buying land within a VW, a maintenance fee and the building costs for the virtual store. Currently a Premium - Second Life Membership costs about USD 70 per year, a private region of 65,536 m² about USD 1000 and the monthly maintenance fee amounts to USD 295. The building costs of a store can range from a couple of hundreds to as much as a quarter of a million US-Dollars, depending on the complexity of the programming and the desired layout. In addition it must be said that on a short-term basis it is rather unlikely that initial investments can be recovered by actual sales. This is because, although, many avatars might visit the virtual store the conversion rate of visitors who turn into actual buyers is about 5% and price levels are very low (e.g. a suit in *Second Life* costs about L\$287 which is about USD 1). In fact one out of three SL residents spends less than about USD 40 and only one out of five spends more the USD 400 per week.¹⁸⁵ Moreover, companies should be careful to not artificially raise expectations in terms of real life products as customers might be disappointed. For instance, when a company offers a pair of shoes in 100 different colors in its virtual store, customers might start to look for the same choice in the companies' real life stores and end up being disappointed because the company can simply not fulfill the customers' expectations.¹⁸⁶

5.1.3. Market Research

To conduct market research in VWs is another business opportunity. The big advantage of virtual market research compared to standard market research is that costs can be

¹⁸² Kaplan et al. (2009), p.567.

¹⁸³ Schlosser (2003), p.196.

¹⁸⁴ Kaplan et al. (2009), p.567.

¹⁸⁵ Kaplan et al. (2009), p.567.

¹⁸⁶ Kaplan et al. (2009), p.567.

substantially reduced. E.g. through conducting virtual focus groups costs can be reduced by about 33% and in the case of quantitative surveys the cost are 50% lower than in real life.¹⁸⁷

Furthermore, researchers can make use of the special characteristics of VWs including their high degrees of user interactivity and impressiveness. VWs especially favor certain fields of research such as netnography, which is the study of online communities and their culture.¹⁸⁸ VWs can also function as test markets for firms that want to introduce new products or services to the market. A trial run in a VW can ultimately reduce the risk of failure. For instance when the *Starwood Hotels & Resorts Group* decided to launch *Aloft*, a new branch of design hotels they used SL as a test market, which led to a series of design changes thanks to supportive SL-residents.¹⁸⁹ Figure 5.2 shows the *Starwood Hotels & Resort Aloft Project* in *Second Life* and in reality.

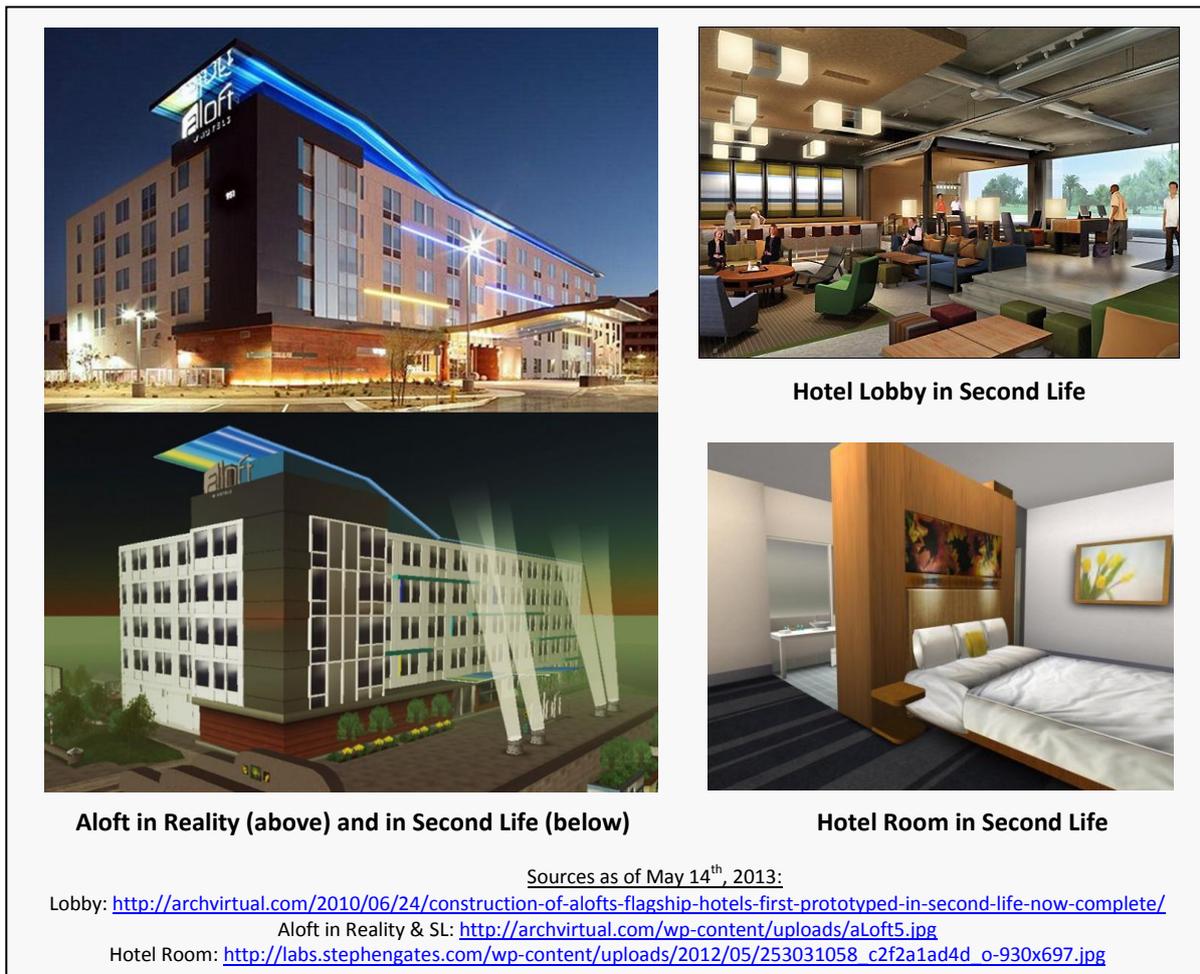


Fig. 5.2: Starwood Hotels and Resorts in Second Life

¹⁸⁷ Kaplan et al. (2009), p.567.

¹⁸⁸ Kaplan et al. (2009), p.567.

¹⁸⁹ Kaplan et al. (2009), p.567f.

5.1.4. Human Resource Management

The use of VWs for Human Resource Management tasks, such as recruiting, represents the fourth business opportunity for companies. More and more companies and service providers choose VWs to organize recruiting events. Every user can seek an interview at each event, however just as in real life only a few applicants are actually invited to an interview based on their qualifications.¹⁹⁰ For some companies such as *eBay* or *T-Mobile*, recruiting in VWs represents an opportunity to get in touch with very creative and technologically advanced job candidates. Other companies might decide to include *Second Life* in their HR-strategy only to increase their positive image and attractiveness as potential employer among recruits.

VWs can also help to raise awareness for offline events through advertising such as done by *Auchan*, a French retailer who bought billboards in SL to promote a series of recruiting events across France. However, companies should keep in mind that recruiting in VWs can not entirely replace real life recruiting activities, because some potential candidates may not have an account in a VW, or may prefer more traditional ways.¹⁹¹ Furthermore, there are some risks involved when recruiting in-world, as companies have to trust that the person behind the avatar does actually possess the qualities and abilities presented and stated during the in-world job interview which might or might not be the case.

5.1.5. Internal Management

Finally, companies can also use VWs as a platform for internal process management. These internal process management tasks range from administrative tasks such as organizing meetings to the exchange of knowledge. The companies *Cisco* and *IBM* own corporate islands in SL which are reserved exclusively for the avatars of company employees and which are used for internal management purposes.¹⁹² Other companies such as the *Crown Plaza Hotel Group* offer in-world services such as the possibility to rent a virtual meeting room, allowing business people to meet their local and international business partners in VWs. This does not only reduce travelling costs and saves time, but it allows people as well to attend meetings from the comfort of their own living room. Furthermore, it makes rather limited

¹⁹⁰ Kaplan et al. (2009), p.568.

¹⁹¹ Kaplan et al. (2009), p.568.

¹⁹² Kaplan et al. (2009), p.568.

ways of interaction like video and phone conference systems obsolete.¹⁹³ However, physical meetings are still far away from disappearing, because there are still a lot of challenges that have to be faced when it comes to conducting business in VWs, especially regarding the legal nature, regarding trust issues and user friendliness.¹⁹⁴ These challenges include questions such as: Who is the owner of a product which has been developed in a VW? Do you want to negotiate a million-dollar deal in a virtual world? Are your business partners capable of using and navigating in a VW?

5.2. Overcoming Business Challenges

The fact that VWs did not become the virtual shopping-temples that will revolutionize electronic commerce, as originally intended¹⁹⁵, is partly rooted in the fact that the organizational adoption rate of VWs is very slow. This is due to the fact that several VW-pioneers failed to succeed with their virtual business strategies, which in turn functioned as a negative example for considerable competitors and other companies and kept them from establishing a corporate VW-presence of their own. Furthermore, it has been shown that companies are only willing to enter VWs if other companies do the same.¹⁹⁶

In order to be successful in VWs companies have to understand user's motivation to participate in VWs and the special characteristics of these virtual places. Thus, the big challenge for companies is to be aware of the culture of VWs and to know about the key motivation factors for users to spend time in-world. These main motivational factors include: to meet people and build relationships, to earn money, to be entertained, to have fun and to learn, as seen in chapter 2. Therefore, understanding VWs and its users ultimately translates into the following five important guidelines companies should follow: catch traffic, reward presence, be innovative, establish a learning environment and show that you care about avatars.

5.2.1. Catch Traffic

VWs are place where people go, to get to know people and build up relationships. Therefore, users typically prefer in-world places where they can meet other avatars. Based

¹⁹³ Kaplan et al. (2009), p.568.

¹⁹⁴ Kaplan et al. (2009), p.568.

¹⁹⁵ Turner et al. (2013), Retrieved on June 15th, 2013.

¹⁹⁶ Yoon et al. (2013), p.786.

on this fact companies have to ensure a high amount of traffic on their properties, to create an interesting and worth-visiting destination for avatars. Empty and deserted corporate properties are one of the major problems companies have to face in VWs.¹⁹⁷ Thinking that the mere existence of e.g. a flagship store in a VW will be sufficient to attract avatars is a common misbelieve. Thus, companies have to actively engage in activities that will draw avatars attentions to their corporate properties. There are a number of activities that can help companies to catch traffic such as giving away freebies (clothes, land, etc.), organizing events, games or contests such as having avatars participate in a marathon and donating money to a real life charity for every marathon runner who completed the run.

5.2.2. Reward Presence

Another way to increase avatar-visits is to compensate their presence. This is very appealing to avatars because just as in the real world a lot of things are not for free in VWs and thus avatars require money to have fun and to satisfy their desires. In addition some avatars might also use the money earned in VWs to complement their real life earnings. One way to reward presence would be to set up virtual sitting or “hang out” areas and pay avatars a small amount of money to stay on your property. Other companies such as the French market research company *Repères*, pay avatars for participating in market research surveys or projects.¹⁹⁸

5.2.3. Be Innovative

User’s expectations of VWs are very high. They are looking for fun, excitement and entertainment and things to do that they wouldn’t be able to do in the real world. Thus, companies have to be innovative and create new and compelling environments and experiences for avatars, because a lack of innovativeness will be punished.¹⁹⁹ In 2007, *Coca-Cola* for instance invited 100 *Second Life* residents to a virtual movie premier which complemented a real life advertising campaign.²⁰⁰ As this is something that only very few people get to attend in real life, events like this are highly successful in VWs.

¹⁹⁷ Kaplan et al. (2009), p.569.

¹⁹⁸ Kaplan et al. (2009), p.569.

¹⁹⁹ Kaplan et al. (2009), p.569.

²⁰⁰ Kaplan et al. (2009), p.569.

5.2.4. Establish a Learning Environment

Another key motivator for VW-users is to learn something or to have new experiences. Thus, companies can use this fact and establish learning environments for avatars where they have the possibility to learn about e.g. manufacturing processes, company history, recent topics etc. These learning environments will not only draw visitors to a company's store or VW-property, but they will increase brand awareness and customer-loyalty as well. The computer manufacturer *DELL*, for instance built a giant computer on its SL Island, allowing avatars to enter it and to learn how a PC works from the inside.²⁰¹ *DELL's* corporate performance in SL is shown in figure 5.3.



Fig. 5.3: Computer Manufacturer – DELL in Second Life

Other possibilities include games or quizzes where avatars have to answer topic-related questions or the experience of parachuting from a virtual skyscraper. Furthermore, as well Universities such as Harvard or Stanford use VWs to enhance the experience and learning environment of their distance learning programs.²⁰²

5.2.5. Show that You Care

Finally companies need to understand that VWs are more than just a game for users. VWs are an extension of real life.²⁰³ Some users spend several hours per day navigating their avatars through a VW, thus they take their virtual life very seriously and expect companies to do the same. To be taken seriously in VWs companies must show that they care about avatars and their virtual home. One way to do so is to regularly update a company's in-world

²⁰¹ Kaplan et al. (2009), p.569.

²⁰² Kaplan et al. (2009), p.570.

²⁰³ Kaplan et al. (2009), p.570.

presence, to ensure that avatars will have a continuous and exciting experience when visiting the corporate VW-property. To put it simpler, corporations must come alive in virtual worlds in order to be interesting for avatars.

5.3. Own vs. Collective Virtual Worlds

For some of the biggest global brands, especially for those operating in the media and entertainment industry, it seems that there is a tendency towards owning a virtual world of one's own instead of positioning a brand besides others in an open virtual world such as SL.²⁰⁴ The result of this tendency is *“the emergence of branded stand-alone virtual worlds that are a true convergence of gaming, entertainment, community, fantasy and commerce aimed specifically at young people aged from 24 down to 4.”*²⁰⁵

The benefits of such a VW-strategy are obvious: more creative freedom when it comes to design choices etc., less competition, more possibilities for market research and above all the possibility to sell and advertise products to a much more targeted group of potential customers. This is because, only users that somehow identify themselves with a brand will choose to visit a VW owned by a single corporation. Examples for big players applying this VW-strategy of owning a corporate-VW include *Disney, Viacom, Sony, Coca Cola* and *Wells Fargo*.

In 2003, *Disney* launched *Toontown* a VW specifically designed for kids to engage in online games via avatars representing popular *Disney* characters such as *Mickey Mouse* and *Donald Duck*. The huge success of *Neopets* did not remain unnoticed to *Viacom*, the world's fourth-largest media conglomerate, who bought *Neopets* in 2005 for USD 160 million.²⁰⁶ Similarly *Disney* acquired *Club Penguin* in 2007 for USD 370 from *New Horizon Interactive*.²⁰⁷

PlayStation Home was launched in 2009 and is a VW owned and operated by *Sony*. *PlayStation Home* contains public as well as private “home” spaces such as apartments which can be individually decorated. On different islands avatars can participate together

²⁰⁴ De Mesa (2009), p.60.

²⁰⁵ De Mesa (2009), p.53.

²⁰⁶ Wikipedia – Viacom, Retrieved on May 15th, 2013 from <http://en.wikipedia.org/wiki/Viacom>.

²⁰⁷ Wikipedia – Club Penguin, Retrieved on May 14th, 2013 from http://en.wikipedia.org/wiki/Club_Penguin.

with others in many different games, quests and special events. Figure 5.4 shows some impressions of *Sony's PlayStation Home*.

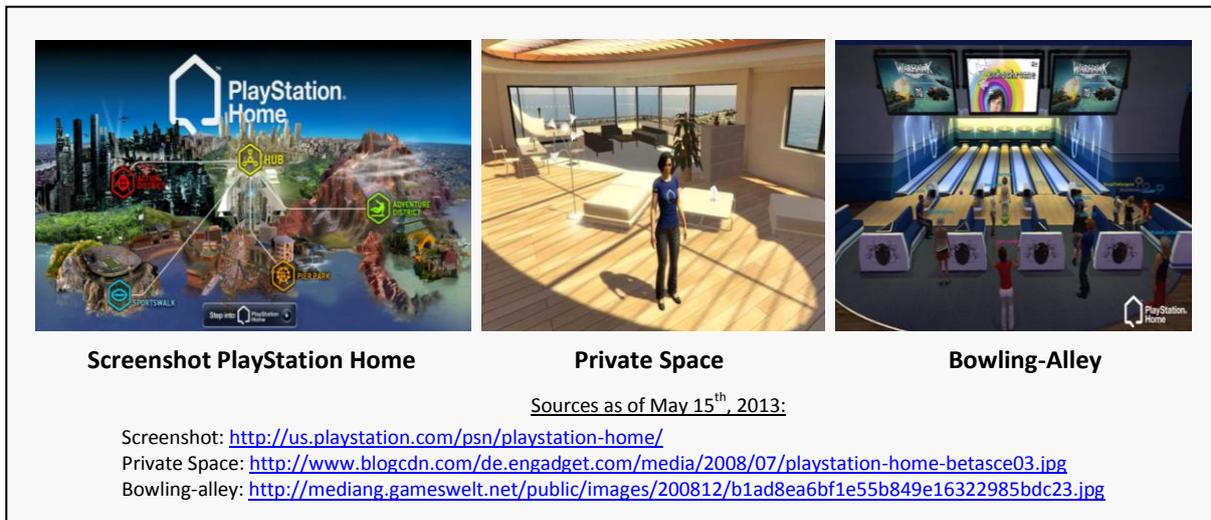


Fig. 5.4: PlayStation Home the Corporate Virtual World of Sony

In the “Hall of Fame” users can display their trophies for in-game achievements and score rankings for real-time *PlayStation* games. Through this application *Sony's* corporate VW is linked to their real life game-consoles such as the different *PlayStation* generations.²⁰⁸



Fig. 5.5: Coca-Cola's Virtual World CC-Metro

With *Coke Studios*, which was part of *MyCoke.com* (later *Coke.Music.com*), *Coca-Cola* was one of the first brands to ever incorporate a VW in their website. *Coke Studios* was launched in 2002 and targeted primarily teens and young adults. *Coke Studios* allowed residents for example to create music mixes in virtual studios and to share them with

²⁰⁸ De Mesa (2009), p.60.

others.²⁰⁹ After exploring other VWs such as SL, in 2007 *Coca-Cola* decided to launch an improved version of their VW, under the new name *CC-Metro* together with *Makena Technologies*, the operators of the VW *there.com*.²¹⁰ Figure 5.5 shows the VW *CC-Metro*. However, in 2010 *there.com* was shut down and consequently as well *CC-Metro* which was housed within *there.com* closed.²¹¹ As of May, 2nd 2012 *there.com* reopened its virtual world doors²¹², however *CC-Metro* remains closed up to the present.

The *Wells Fargo* bank is another example of a company launching its own VW. The company's VW *Stagecoach Island* is exclusively designed to educate young people about money matters through social interaction and the participation in games and quizzes.²¹³ After this short excurses into the economic side of VWs, chapter 6 will now return to the main topic and continue with Avatar-based Innovation Processes.

²⁰⁹ De Mesa (2009), p.135.

²¹⁰ De Mesa (2009), p.59.

²¹¹ Coca-Cola CC Metro, Retrieved on May 15th, 2013 from <http://www.mycoke.com/htmls/Downloads/CCMetroSurvey>.

²¹² Wikipedia – There.com, Retrieved on May 15th, 2013 from <http://en.wikipedia.org/wiki/There.com>.

²¹³ Hemp (2006), p.52.

6. Case Studies

In order to get a better understanding of how Avatar-based Innovation Processes can look like, in the following three selected case studies will be presented and thoroughly analyzed to highlight the characteristics as well as advantages and challenges of ABIPs. According to Yin's basic types of designs for case studies, the three case studies have been chosen following the multiple-case design from a holistic point of view.²¹⁴

6.1. Business Process Modeling in a Virtual World

Until recently the task of Business Process Modeling (BPM) was executed by using computer supported 2D representation models, as illustrated in figure 6.1. These representation models use standardized, basic shapes such as rectangles, circles, arrows or rhombuses in order to depict business processes. The basic shapes are standardized according to the Business Process Modeling Notation (BPMN).²¹⁵

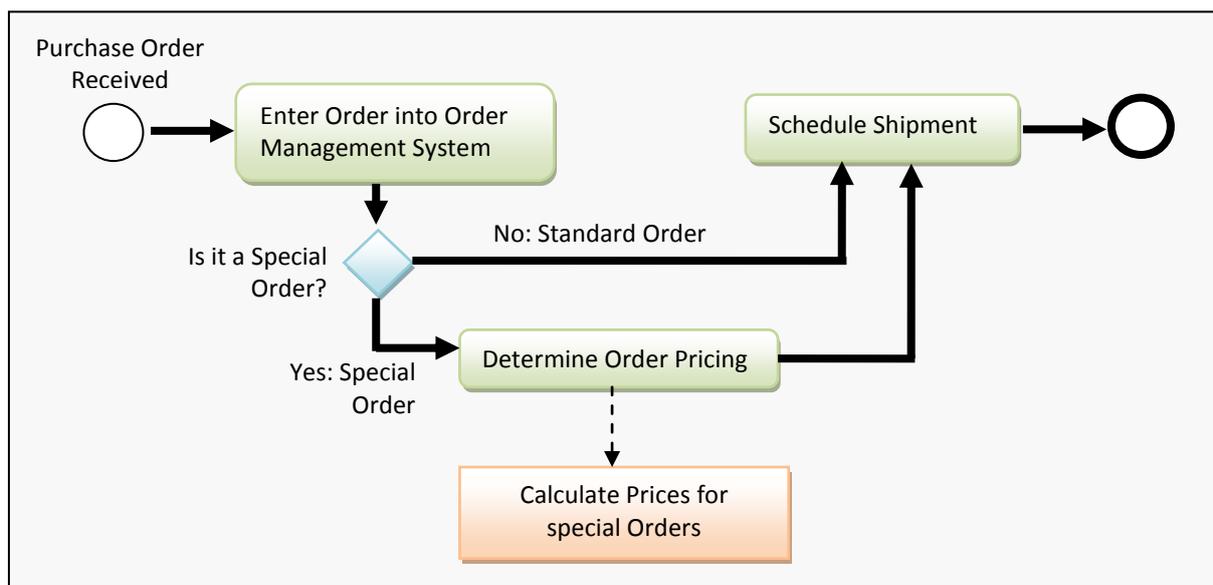


Fig. 6.1: Example 2D -Business Process Modeling (Own illustration based on http://blogs.msdn.com/blogfiles/nickmalik/WindowsLiveWriter/BlametheComputerABusinessProcessModeling_F4AC/Automated%20Processes%20Example2_2.png as of May 22nd, 2013)

As business is becoming more and more international the task of BPM not only gets more difficult in terms of complexity but it requires as well higher levels of collaboration between business partners. The existing BPM-applications however, are not suitable for

²¹⁴ Yin (2009), p. 40.

²¹⁵ Brown et al. (2011), p.4.

cross-organizational and cross-national collaboration during BPM-processes. Therefore, there is need for a new approach.²¹⁶

Brown et al. (2011) suggest using a virtual environment for the collaborative task of BPM. In order to test their theory they developed a BPM tool entitled *Process Modeler* in the VW of *Second Life*. The *Process Modeler* allows the design of 3D business process models on an interactive grid-surface. When touching one field of the grid system users are presented with a list of standard BPMNs to choose from. Thus, the interactive *Process Modeler* allows for continuous modifications throughout the modeling process.²¹⁷ Figure 6.2 shows a team member-avatar working with the interactive *Process Modeler* in *Second Life*.

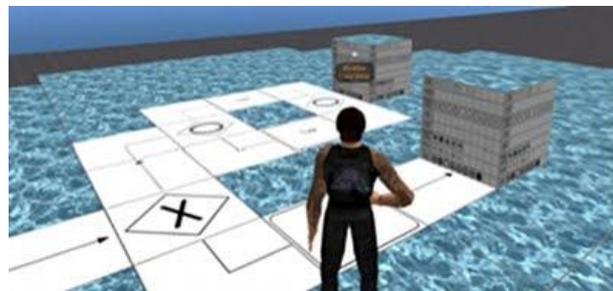


Fig. 6.2: Process Modeler in Second Life

(Retrieved on May 22nd, 2013 from

http://1.bp.blogspot.com/_4TnR7BbfV4c/S_Cvukf8Dfi/AAAAAAAAAVw/r611Poh1GMs/s1600/AMCIS.jpg)

Besides, the *Process Modeler*, which was specifically designed by Brown et al. (2011) for the purpose of their study, they used as well other helpful SL-tools. These additional tools can be bought in SL and include a *Mind Mapper* and an *Information Holodeck*. The *Mind Mapper* was used in order to support and document the outcomes of team-brainstorming sessions. The *Information Holodeck* looks like a huge screen which can be easily moved from one location to another and was mainly used in order to display useful information such as the content of websites or pictures from previously created business models etc.²¹⁸

In their field experiment Brown et al. (2011) used SL and the previously presented tools in order to model a typical Credit Card Application process. To do so they invited a handful of people to participate in this virtual test. Four out of five participants had none or only little experience with VWs, while one person had extended knowledge of VWs and the required

²¹⁶ Brown et al. (2011), p.2.

²¹⁷ Brown et al. (2011), p.11.

²¹⁸ Brown et al. (2011), p.13.

tools. This person took on the role of a facilitator in order to give advice and guide other team members.²¹⁹ Although, some of the participants were rather skeptical when first confronted with the idea of BPM in SL together with others who were not present in the same room, once the experiment started they could be quickly convinced by the usefulness and great potential of this approach.²²⁰

The overall outcome of the experiment conducted by Brown et al. (2011) was that BPM in VWs de facto facilitates the collaborative process between team members and helps to overcome many of the challenges encountered with 2D-models, especially when facing geographical dispersions. This is because VWs not only allow the design of three-dimensional models which are much more appealing to human senses, but above all they considerably improve communication and the modeling process itself.²²¹

One of the main advantages of transferring the BPM-process into a VW is the fact that concurrent collaboration is possible as all members work on one model at the same time and in the same virtual place. Furthermore, communication is considerably augmented as team members can observe other team member-avatars while working on specific parts of the model. Therefore, the mixture of non-verbal cues, such as the recognition of gestures, signals and the observation of team members, along with more traditional ways of communicating in virtual settings, such as audio chats used for immediate discussions or text messaging, considerably enhances group communication.²²² Examples for non-verbal cues include waving with one's virtual arm to catch another co-collaborator's attention, the possibility to pick up a virtual element and to carry it to another location and virtual air-typing while typing on one's keyboard in order to inform others about the fact that a new message is currently written. Furthermore, the experiment showed that due to the fact that the environment of VWs is surprisingly similar to the classical look and feel approach of BPM²²³, participants had no problems handling the virtual-tools as they were guided by their intuitiveness.²²⁴ All these advantages contribute to the fact that BPM in VWs goes well

²¹⁹ Brown et al. (2011), p.15.

²²⁰ Brown et al. (2011), p.17.

²²¹ Brown et al. (2011), p.7.

²²² Brown et al. (2011), p.23f.

²²³ Brown et al. (2011), p.9.

²²⁴ Brown et al. (2011), p.18.

beyond the existing 2D representation models and video conference applications, especially when working together with international partners. This highlights once more the great potential of VWs when it comes to collaborative projects. The authors of Brown et al. (2011) are currently working on ways to improve remote collaborative process modeling in VWs using 3D avatars and the virtual *Process Modeler*.²²⁵

6.2. Coca-Cola's Virtual Thirst Contest

The second case study illustrates how companies can make use of the creative potential of avatars through creativity challenges and contests. In May 2007, the *Coca-Cola Company* launched the *Coke Virtual Thirst Design Contest* in SL together with the VW marketing agencies *Crayon* and *Millions of Us*. By that time *Coca-Cola* had already gained valuable experience with other VWs including *Habbo* and its own *Coke Studios* and *CC-Metro*.²²⁶ As far as marketing and branding within VWs is concerned *Coca-Cola* has to face a major dilemma because unlike other consumer goods manufacturers, the company's main products, namely beverages, are basically useless in VWs.²²⁷ Therefore, instead of marketing virtual versions of their real-world products, the company had to come up with a new and innovative concept to establish the brand *Coca-Cola* in the VW of SL. To do so *Coca-Cola* invited SL-residents to come up with new and creative concepts and ideas for virtual vending machines that dispense not Coca-Cola but a refreshing and invigorating experience that represents the brand.²²⁸ Michael Donnelly, the Coca-Cola Company's Head of Global Interactive Marketing, explained the design competition in the following way: *"Put simply, we've invited the world to use the Second Life platform to design and prototype the ultimate Coke machine – something that delivers an innovative, engaging experience in Second Life, as defined by its community of residents."*²²⁹

Coca-Cola made three thought-provoking prototypes of virtual vending machines available to participants, but besides these prototypes participants were given complete creative freedom as far as their design and experience choices were concerned.²³⁰ Concepts

²²⁵ Poppe et al. (2013).

²²⁶ De Mesa (2009), p.70.

²²⁷ Capps (2007), Retrieved on June 2nd, 2013.

²²⁸ Kohler et al. (2009), p.400.

²²⁹ Coca-Cola Company Press Release (2007), Retrieved on June 2nd, 2013.

²³⁰ Coca-Cola Company Press Release (2007), Retrieved on June 2nd, 2013.

could be submitted either directly in SL as illustrated in figure 6.3, or via *Myspace*, *Youtube* and the Coca-Cola website. Following the submission, the concepts were evaluated by a panel consisting of SL-residents and designers. The winning concept, the so called “lucky-puzzle-bottle-concept” was made up by just the right amount of surprise and experience. When an avatar comes across one of the three puzzle-bottles, he or she is invited to solve the puzzle. Once the puzzle is solved the avatar and others nearby are offered a surprising experience including an arctic photo-booth, a bubble ride in a giant Coca-Cola bottle as well as a snow-ball dispensing vending machine allowing residents to engage in a virtual snow-ball fight.²³¹ In addition the avatar will receive the desired beverage as well as a useful goodie such as an electric guitar or a scooter. Following the announcement of the winning concept, the winner was invited to San Francisco in order to put her puzzle-bottle concept into SL-reality with the help of VW experts.²³² Figure 6.3 shows impressions from Coca-Cola’s Virtual Thirst Contest in SL.

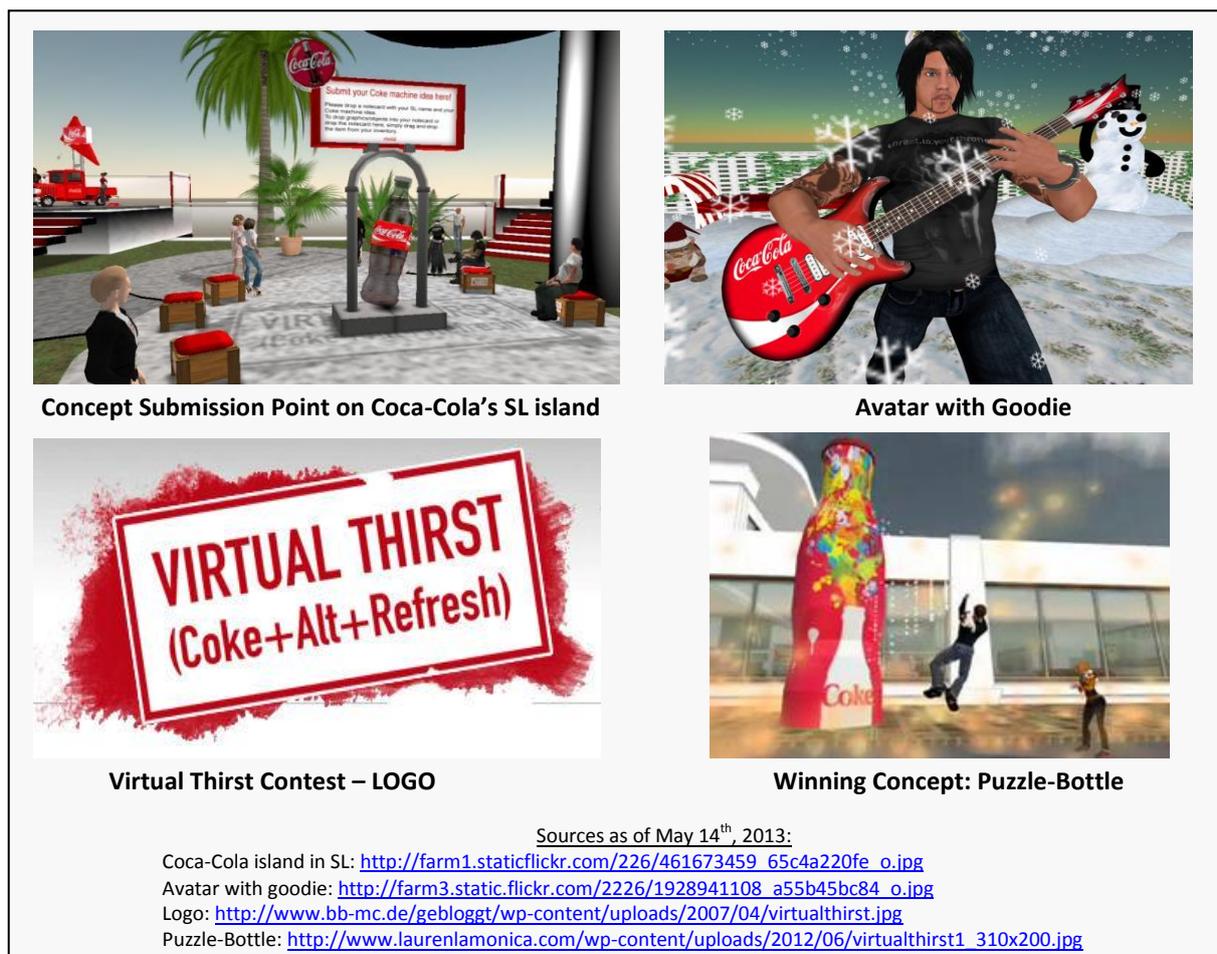


Fig. 6.3: Coca-Cola's Virtual Thirst Contest

²³¹ De Mesa (2009), p.70.

²³² Coca-Cola Company Press Release (2007), Retrieved on June 2nd, 2013.

Coca-Cola's Virtual Thirst Design Contest shows how companies can make use of the creative potential of VW-residents during the idea generation phase. According to Michael Donnelley, the Coca-Cola Company's Head of Global Interactive Marketing, VWs offer an environment where companies might come across radical innovations induced by residents. This is because VWs allow avatars to express rather drastic and radical ideas that might only exist in their minds. In order to uncover those hidden ideas companies must listen and collaborate closely with community members. By doing so they will gain valuable insights about the community, desires, brand perception etc. Although, one might argue that the real world potential of those ideas is limited, it remains a fact that VWs are a great source of inspiration.²³³

Furthermore, this case study shows that collaborating with VW-experts can substantially augment brand perception and reputation as well as the in-world activities of companies. In addition by challenging SL-avatars to come up with ideas for concepts that will dispense an experience, *Coca-Cola* demonstrates that it did its homework and understands and values what VW-residents are longing for, namely experiences rather than virtual product replicas.

6.3. IBM's Global Innovation Outlook

In the third case study a virtual discussion and brainstorming session are presented. *IBM's Global Innovation Outlook* (GIO), was created with the intention to bring together people from different disciplines, including creative minds, policymakers, opinion leaders, researchers as well as business executives. The main idea behind the GIO was to create a platform for discussion, exploration and knowledge exchange that will promote collaboration and innovation.²³⁴

In December 2009, as part of the GIO, *IBM* hosted a virtual roundtable discussion in the VW of SL. The discussion focused on the topic of "Smarter Cities" and was attended by *IBM* employees as well as students and faculty members from the University of Southern California's Marshall School of Business. The aim of the roundtable discussion was on the one hand to discuss and gain new ideas concerning the topic of smarter cities and on the other hand to explore collaboration possibilities within VWs. As most of the 17 participants,

²³³ Kohler et al. (2009), p.401.

²³⁴ IBM, Retrieved on June 2nd, 2013 from <http://www.ibm.com/ibm/gio/us/en/index.html>.

including six *IBM* employees and eleven participants from the University of Southern California, had only little experience with SL a virtual “meet-and-greet” was organized one week before the actual roundtable. This preliminary meeting offered participants the possibility to get familiarized with the tools, solve technical difficulties and to get to know each other. In addition participants were also provided with a protocol including VW meeting etiquette and rules regarding the use of avatar-gestures and chats.²³⁵

The actual roundtable discussion took place on *IBM’s EduCenter Island* in SL and was divided into three parts. The first part was a general roundtable discussion as illustrated in figure 6.4. Just as in real-life discussion settings the tables were arranged in the form of a “u” allowing all participants to watch other participants at all time during the discussion. Furthermore, this arrangement made it possible for the discussion-moderator, who also functioned as a facilitator, to stand in the middle in order to chair the conference.²³⁶



Fig. 6.4: Roundtable Discussion during IBM’s Global Innovation Outlook

(Retrieved on June 2nd, 2013 from <http://www.ibm.com/developerworks/opensource/library/os-social-secondlife/figure1.jpg>)

During the second part of the GIO-Meeting the so called *Opinionator*, illustrated in figure 6.5, was used to facilitate the discussion, focusing on six subtopics including issues such as Public Safety & Security, Healthcare and Energy & Utilities. The *Opinionator* is an interactive polling tool which consists of different areas corresponding to the main discussion points. Participants were presented with a number of questions such as “*If you were the mayor of Los Angeles, which urban system would you make a priority?*” and answered by walking into one of the differently colored areas which represented the six subtopics.²³⁷

²³⁵ Ghandi (2010), Retrieved on June 2nd, 2013.

²³⁶ Ghandi (2010), Retrieved on June 2nd, 2013.

²³⁷ Ghandi (2010), Retrieved on June 2nd, 2013.

The final and third part of *IBM's* Virtual-GIO was specifically devoted to the topic of education with regards to smarter cities. During this final part the custom-made brainstorming tool *BrainBoard*, as illustrated in figure 6.5 was used to assist discussion members. Participants were asked several questions and answered by writing their answers on sticky-notes, which were subsequently placed on the board. Once all answers were collected the moderator grouped them into four categories.²³⁸

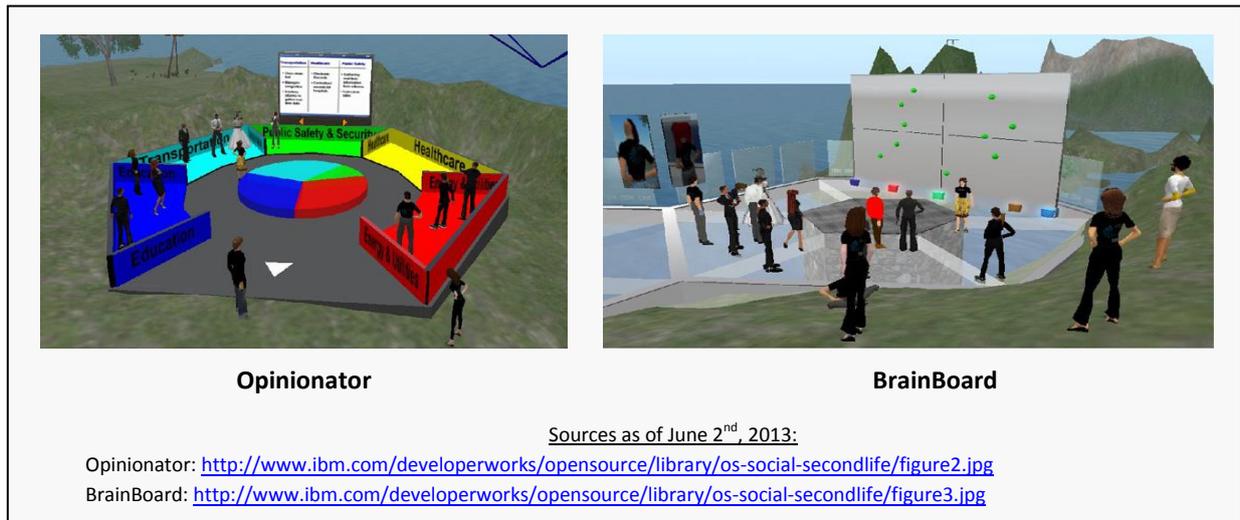


Fig. 6.5: IBM's Global Innovation Outlook

By organizing a GIO-Meeting in a VW *IBM* gained valuable insights about how to conduct meetings in virtual environments. Among the lessons learned one can find rules such as simplicity is a key to successful meetings. Moreover, the virtual GIO conference showed that simple, 3D and VW-specific tools such as the *Opinionator* worked very well while more complicated tools such as the *BrainBoard* represented a substantial challenge, especially for VW-novices.²³⁹ This is because the *Opinionator* required participants to execute only one specific task namely walking into one of the differently colored sections. In the case of the *BrainBoard* however, participants needed to execute a series of task namely writing an answer on a virtual sticky note, walking with the note to the board, putting the note on the board and walking away. Although, in reality these tasks seem fairly simple in virtual settings they require extended knowledge. Furthermore, including a number of traditional real-world activities into the conference-agenda, such as a traditional roundtable discussion, proved to be very helpful to put VW-novices more at ease.

²³⁸ Ghandi (2010), Retrieved on June 2nd, 2013.

²³⁹ Ghandi (2010), Retrieved on June 2nd, 2013.

The GIO meeting showed that when it comes to virtual meetings, knowing your participants and their background is even more important than in reality, as the potential for distractions is much higher.²⁴⁰ This is because participants are subject to in-world as well as real-world distractions. On the one hand, VWs are fascinating places where one's attention can be easily redirected to another avatar flying around or suddenly appearing next to one another and on the other hand, the person sitting in front of the computer screen can be interrupted by someone walking into the room or by a new text message. Thus, VW-meetings require a detailed and well elaborated agenda and, furthermore, a great amount of time should be invested into finding tools and ways to keep participants focused on VW-tasks.

²⁴⁰ Ghandi (2010), Retrieved on June 2nd, 2013.

7. Conclusion

ABIs represent a new chapter when it comes to user-centered innovation processes as they link open innovation processes with VWs. With regards to innovation types ABIs represent a process innovation aimed for product, process, social or administrative innovations. This is because ABIs improve user-centered innovation processes by moving the innovation process into 3D virtual environments in order to develop new solutions for real-world problems. Thus, in terms of innovations VWs represent an unprecedented, media-rich environment allowing direct and real-time interaction between companies and users during the innovation process.²⁴¹ Figure 7.1 shows how Avatar-based Innovations bring together VWs and Open Innovation Processes.

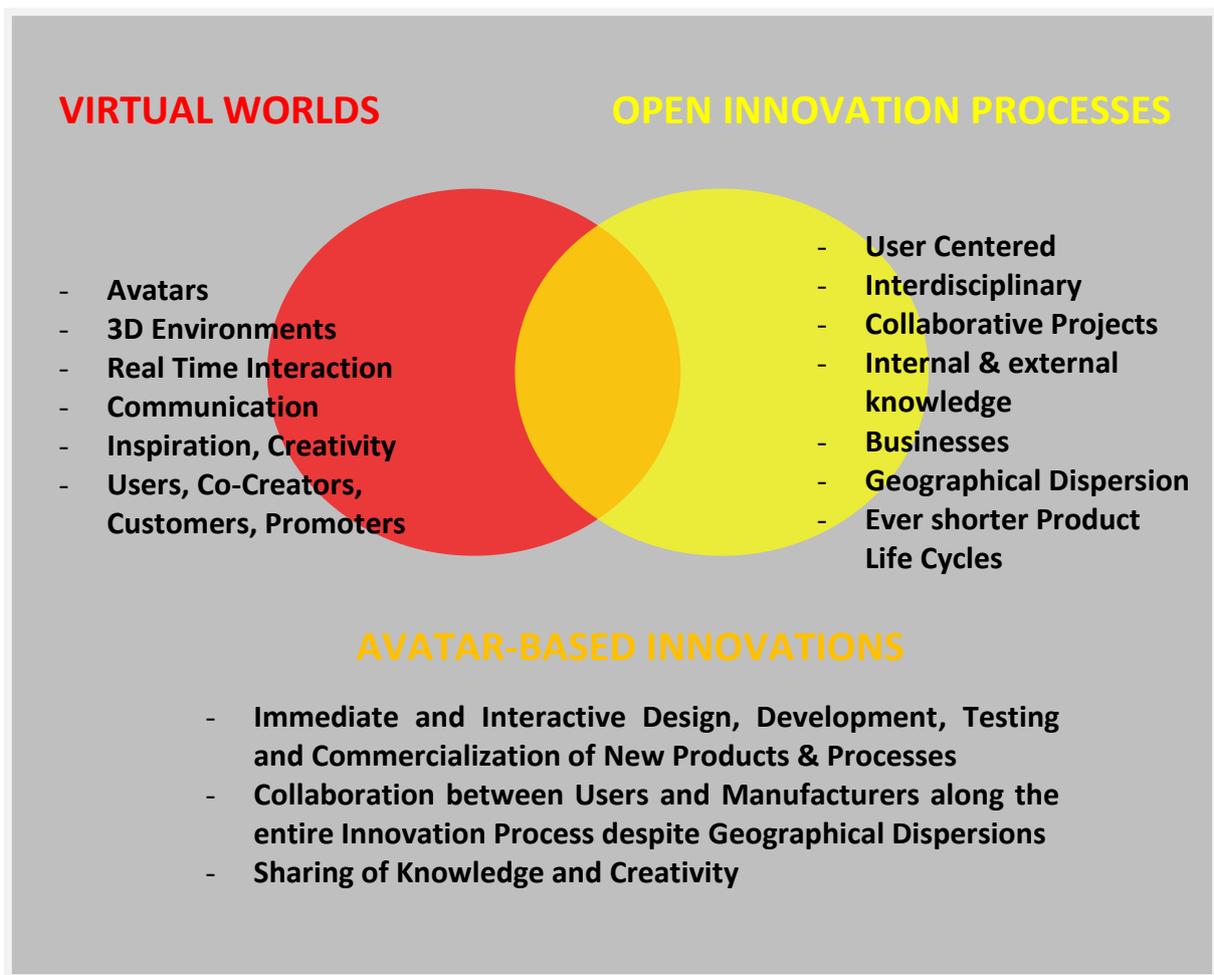


Fig. 7.1: Relation Virtual Worlds – Innovations – Avatar-Based Innovations

²⁴¹ Kohler et al. (2009) p.395.

As the influence of VWs on the real-world increases, due to increasing economic activities within VWs and increasing participation in general, avatars use virtual environments to design prototypes of real-world products and processes.²⁴²

Through the transfer of innovation processes into VWs, avatars and thus users can be integrated along the entire innovation process, assuming different roles during each phase^{243,244}. In the beginning avatars function as a source for ideas and creativity during the idea generation phase.²⁴⁵ During this initial phase companies might invite avatars to participate in brainstorming sessions, round table discussions or creativity challenges and contests in order to tap into the creative potential of VW-residents.

In the following design and development phase avatars take on the role of co-creators and participate in the construction of process models and product-prototypes. The first two phases of the virtual innovation process are especially appealing and interesting for creativity seekers who enjoy challenging themselves in order to come up with new and innovative solutions.²⁴⁶

Once a prototype has been developed avatars assume the role of users in order to test and evaluate the new product in the virtual environment before it is launched on the real market.²⁴⁷ Through running cycles of trial and error in VWs both avatars and companies can benefit and help to make products and processes more user-friendly and efficient.

During the final commercialization-phase avatars assume the roles of both customers and promoters. Besides buying products and services, avatars provide valuable post-sale feedback and help to raise awareness among peers. This highlights that through the transfer of innovation processes into VWs, avatars and thus users can be integrated into the entire innovation process, as summarized in Table 7.1.²⁴⁸

²⁴² Hemp (2006), p.54.

²⁴³ Füller et al. (2010), p.1377.

²⁴⁴ Hoyer et al. (2010), p.290.

²⁴⁵ Füller et al. (2010), p.1377.

²⁴⁶ Eisenbeiss et al. (2012), p.17.

²⁴⁷ Füller et al. (2010), p.1377.

²⁴⁸ Novak et al. (2013).

Phases of the Innovation Process	Role of Avatars	Activities
Idea Generation and Screening	Source for ideas and creativity	Brainstorming sessions, round table discussions, creativity challenges and contests
Design and Development	Co-creators	Participation in the construction of process models and product prototypes
Testing / Trial and Error	Users	Testing and evaluation of new products in VWs prior to real-world market launch, to improve efficiency and user friendliness
Commercialization	Customers and Promoters	Purchase and promotion of products, awareness raising among peers, post-sale feedback

Table 7.1: Integration of Avatars in Innovation Processes
(Own illustration based on Novak et al. 2013)

7.1. Key Findings

In today's world, innovations are regarded as crucial for entrepreneurial success and as a motor for economic wellbeing. This results in the fact that the necessity for innovations constantly augments, representing new challenges for companies and innovators. In this context ABIPs have great potential as they are routed in the combination of Avatars, Innovations and VWs which allows for the concurrent and interactive collaboration between consumers and manufacturers along the entire innovation process. This web-based collaboration relies on the willingness of VW-residents to participate in innovation projects which in turn is guided by the functional, experiential and social motivators that cause people to spend time in VWs. In the following the great potential and advantages of ABIPs are outlined, in order to answer the question and summarize why VWs are breeding grounds for innovations.

7.1.1. International, Interdisciplinary and Concurrent Collaborations

The constant need for innovations and today's business structures result in the fact that innovation processes become increasingly complex, collaborative, international and interdisciplinary. Generally speaking, geographical dispersion is a major handicap for any type of collaboration that involves personal interaction or the development of a prototype. This is even truer when it comes to complex innovation processes. ABIPs resolve this

handicap, as VWs are not geographically bound and can be thus accessed over the WWW from any location. Through ABIPs people from all over the world can come together in order to jointly work on projects. Thus, ABIPs facilitate collaboration, when faced with geographical dispersions, and thus allow for diversity, knowledge exchange and interdisciplinary collaborations which ultimately results in more and better innovations. Furthermore, by transferring innovation processes into VWs, concurrent collaboration between international team members becomes possible as all persons involved can work at the same time and in the same place, on one and the same model or prototype.

7.1.2. Avatar-Communities and Motivators

VW residents, avatars, are primarily motivated by intrinsic motivators rather than extrinsic ones.²⁴⁹ Thus, they typically search for ways to satisfy their need for new and compelling as well as collaborative experiences. Furthermore, users are looking for peers, who share the same motivators and interests in order to form communities. In this context, the possibility to participate in an innovation project together with others allows avatars to have a co-creation experience. If a company manages to make this co-creation experience compelling e.g. through very creative and new tools, avatars will be even more willing to participate and to come up with new and innovative solutions. In addition, avatars are generally willing to share their ideas and reveal their innovations to others, without demanding monetary incentives. Thus, avatars and avatar communities are perfect collaboration-partners for companies during the innovation process. Moreover, collaborating with VW-natives shows a company's appreciation of virtual environments and can thus substantially augment the in world-activities and popularity as well as the real-world brand-image of a certain company.

7.1.3. Improved Communication

The communication possibilities encountered in VWs surpass all previous forms of web-based communication by far. Three dimensional environments and real-time interaction possibilities help to overcome many, previously encountered challenges. Not only are 3D environments and personal embodiments, in the form of avatars, much more appealing to human senses, but they contribute as well considerably to the fact that communication within VWs is considerably augmented, compared to other forms of online communication.

²⁴⁹ Eisenbeiss et al. (2012), p.16.

This is because VWs enable verbal, written and non-verbal communication. Through avatar-body movements emotions can be expressed and conveyed to others, which results in a better VW experience for users. Moreover, through observing other team-member avatars, e.g. while making changes to a product prototype or while participating in a round table discussion, communication as well as the innovation development process itself are considerably augmented. This is because information is now provided not only verbally and in writing but as well through non-verbal and visual cues such as the recognition of avatar-gestures and signals, which enhance communication, collaboration, outcomes and thus ultimately as well the virtual innovation process.

7.1.4. Reduction of Costs, Time and Risk

Another reason why VWs are breeding grounds for innovations lies in the fact that VWs can be not only used for the generation of new and innovative ideas but as well for the development of product prototypes and in order to test these prototypes. This is especially relevant when dealing with innovations, as the innovation process itself is very vulnerable to risk. Virtual product and process prototypes as well as virtual trial and error sessions and simulations help to reduce costs, are less time consuming than in the real-world and help to make the final innovation more user-friendly, more efficient and thus less risky.

7.1.5. Creativity and Imagination as Sources for Innovations

In VWs there are no limits to creativity and imagination thanks to the special characteristics of VWs which only stimulate and promote user creativity. VWs are places where people can live their dreams, express radical ideas and do things which might be not possible in the real world. Thus, for companies VWs offer insights into what people are longing for and thus, what they might also look for in the real world. Consequently through listening and collaborating closely with VW residents, companies can tap into the creative potential of avatars and use them as a source for new and innovative ideas.

7.2. Challenges and Recommendations

Despite the previously discussed advantages of ABIPs there are still challenges that have to be faced. These challenges and ways to overcome them, are discussed in the following.

7.2.1. Distractions

Probably one of the biggest challenges, when conducting collaborative projects in VWs, is to keep avatars focused on the task, as distractions can arise from both inside and outside of the VW. Therefore, for companies it is even more important than in reality to know their participants and backgrounds very well in order to customize tools and reduce possible distractions to a minimum. Moreover, it is of outmost importance to use tools and methods that are very compelling and interesting for avatars and to invest a lot of time in order to create a well elaborated agenda or task-plan. In addition it should be mentioned that thanks to the improved communication possibilities within VWs, which allow observing others while conducting specific tasks such as writing a text message, talking to a fellow avatar or working on a prototype, the potential for distractions is already considerably reduced as one receives additional, visual information about the current activities of colleagues.

7.2.2. Virtual World Novices

The case studies showed, that many participants who engage in collaborative projects in VWs have little or no experience with VWs. This challenge can be overcome by organizing virtual “meet-and-greets” in order to offer participants the possibility to explore a VW, get familiarized with specific tools that will be used later on during the innovation process, resolve technical difficulties and get to know other participating avatars. Moreover, it can be recommended to use only simple tools which are easy understandable and can be thus also used by VW-novices. In this context it is also a good idea to agree on certain rules and a code of conduct to prevent possible misunderstandings which might harm future collaborations. Furthermore, it can be recommended that a more experienced avatar takes on the role of a facilitator who helps, guides and assists avatars in need and who pushes the process ahead when required. Moreover, including real world activities such as traditional round table discussions, or brainstorming sessions can help to put new VW-users more at ease when using VWs as a workspace.

7.2.3. Real World Potential

Another challenge for ABIPs lies in the question whether innovations created in VWs have actually real world potential. VWs are rather unrealistic, fantasy like settings and therefore a product which is highly demanded in a VW might fail in reality. Thus, each idea has to be carefully evaluated and tested in order to determine its real world potential,

before being transferred and launched in the real world. Nevertheless, it remains a fact that VWs are a great source of inspiration, with sheer unlimited creative potential. Furthermore, it should be mentioned that, the more time people spend in VWs the more similar their in-world behavior becomes to their real world behavior.²⁵⁰

7.3. Future Trends and Areas of Research

Although, the first VWs emerged more than a decade ago, VWs have not reached their full potential yet. This belief is strongly rooted in the fact that the majority of VWs is targeting children, who will grow up and increasingly incorporate VWs into their everyday life. As the use and number of VW resident's increases as well companies will increase their VW activities and the frontiers between VWs and reality will become even more blurry as in-world activities will influence reality and vice versa. Google for example will eventually have built a 3D replica of the real world, which will allow people to not only walk the streets of e.g. New York in reality, but as well in the virtual shoes of their avatars.²⁵¹ Possible future developments might also include linking existing corporate and open VWs together in order to create one big network of VWs in which avatars can travel from one VW to another. To do so, the existing challenges of interoperability and different standards and legislations have to be overcome.²⁵²

Today only few companies use VWs for innovation processes, this is on the one hand routed in the fact that VWs did not become virtual shopping-temples as originally intended²⁵³ and on the other hand due to the fact that the organizational adoption rate of VWs is very slow.²⁵⁴ Furthermore, several VW-pioneers failed to succeed with their virtual business strategies, which in turn functioned as a negative example for other industry members²⁵⁵ and there is still a lack of methods to evaluate and quantify the costs and benefits of VW-activities for companies.²⁵⁶ Nevertheless, the great potential of ABIs is already evident from today's point of view and has been thoughtfully discussed within this thesis. As the use of VWs is most likely to increase in the future, due to grown-up digital-

²⁵⁰ Eisenbeiss et al. (2012), p.17.

²⁵¹ Shankland (2010), Retrieved on June 15th, 2013.

²⁵² OECD (2011), p.4.

²⁵³ Turner et al. (2013), Retrieved on June 15th, 2013.

²⁵⁴ Yoon et al. (2013), p.786.

²⁵⁵ Yoon et al. (2013), p.786.

²⁵⁶ Novak et al. (2013).

natives, further research is needed to develop tools, based on quantitative methods, that support managers in their decisions on ABIs and VW-activities and to gain more insights into the true value of ABIs for companies. Moreover, important requirements for the bright future of ABIs include improved user friendliness of VWs in general, better performing computers and higher graphical resolutions to ensure a smooth and enriching experience for all people involved in the collaborative process.

7.4. Final Remarks

When it comes to ABIs one shouldn't ask the question whether it is better or worse to conduct innovation processes in VWs compared to reality. However, in the future one should keep in mind, that VWs are modern toolkits which represent an unprecedented and qualitative comparable alternative to real world environments, when choosing the setting for an innovation process.²⁵⁷ The great possibility here for the future of VWs and thus as well for ABIPs, is to see VWs not only as a place for entertainment and to get away from reality, but as a supplemental and globally connected working space²⁵⁸ which can be used to overcome challenges encountered in the real world, e.g. geographical dispersion, limited resources etc., as a place for learning and knowledge sharing and as a collaborative environment which is especially suitable to find new and innovative solutions with real world potential.

²⁵⁷ Novak et al. (2013).

²⁵⁸ Turner et al. (2013), Retrieved on June 15th, 2013.

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| Coca-Cola CCMetro | http://www.mycoke.com/htmls/Downloads/CCMetroSurvey
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APPENDIX A: Survey – Popularity of Virtual Worlds among Kids

Total number of Participants	110	100,00%
Girls	40	36,36%
Boys	70	63,64%
Number of returned questionnaires	101	91,82%

Age of Participants					
7 years	8 years	9 years	10 years	11 years	12 years
8	10	23	30	17	13
Median: 10 years					

How often do participants use...?			
Computer	never	10	9,90%
	1x per month	22	21,78%
	1x per week	20	19,80%
	more often	35	34,65%
	daily	14	13,86%
	Total	101	100,00%
	Median	1x per week	

How often do participants use...?			
Smartphone	never	34	33,66%
	1x per month	2	1,98%
	1x per week	10	9,90%
	more often	27	26,73%
	daily	28	27,72%
	Total	101	100,00%
	Median	more often	

How often do participants use...?			
Tablet	never	58	57,43%
	1x per month	5	4,95%
	1x per week	16	15,84%
	more often	13	12,87%
	daily	9	8,91%
	Total	101	100,00%
	Median	never	

How often do participants use...?			
Console	never	32	31,68%
	1x per month	22	21,78%
	1x per week	15	14,85%
	more often	26	25,74%
	daily	6	5,94%
	Total	101	100,00%
	Median	1x per month	

How often do participants use...?			
Handheld	never	32	31,68%
	1x per month	24	23,76%
	1x per week	16	15,84%
	more often	20	19,80%
	daily	9	8,91%
	Total	101	100,00%
	Median	1x per month	

How often do participants use...?			
Virtual Worlds	never	34	33,66%
	1x per month	14	13,86%
	1x per week	16	15,84%
	more often	27	26,73%
	daily	10	9,90%
	Total	101	100,00%
	Median	1x per week	

	Computer	Smartphone	Tablet	Console	Handheld	Virtual Worlds
never	10%	34%	57%	32%	32%	34%
1x per month	22%	2%	5%	22%	24%	14%
1x per week	20%	10%	16%	15%	16%	16%
more often	35%	27%	13%	26%	20%	27%
daily	14%	28%	9%	6%	9%	10%
Total	100%	100%	100%	100%	100%	100%

I (my parents) spent money in Virtual Worlds...	never	82	81,19%
	< 1 €	4	3,96%
	< 5€	8	7,92%
	< 50€	2	1,98%
	> 50€	5	4,95%
	Total	101	100,00%
	Median	never	

APPENDIX B: Abstract (English)

In today's public view Virtual Worlds are generally seen as online environments exclusively devoted to entertainment, socializing, gaming and education purposes. However, the full potential of Virtual Worlds is still far away from being reached. This is especially routed in the fact that the majority of Virtual Worlds is targeting children, who increasingly incorporate Virtual Worlds in their everyday life as they grow up.

Innovations are in today's business world crucial for entrepreneurial success and economic well being as companies rely on them to remain competitive and to solve existing problems. In the past decades the innovation process changed from being dictated and initiated by manufacturers to a much more collaborative version, in which manufacturers and consumers work together during each step of the innovation process in order to come up with new and better versions of products, processes and services. As a result companies have to face new challenges, including increasingly complex, international and collaborative working patterns. Furthermore, companies are constantly looking for new ways and toolkits, which allow interacting with customers during the entire innovation process while taking into account the needs of both parties.

In this context Avatar-based Innovations represent promising innovation drivers, as they provide a globally connected working environment for open innovation processes. The use of Avatars and Virtual Worlds allows for an unprecedented form of web based collaboration during the entire innovation process. In addition, the combination of online embodiments, virtual environments and web-based applications and toolkits, encountered in Virtual Worlds, makes them a qualitative comparable alternative to real world environments, when choosing the setting for an innovation project.

This thesis provides an overview of recent developments in Virtual Worlds, presents the three core elements of Avatar-based Innovations and analyses how companies may use Virtual Worlds and Avatars during various steps of the innovation process, by discussing three selected case studies.

APPENDIX C: Abstract (German)

In der Öffentlichkeit werden virtuelle Welten in der Regel als utopische Zufluchtsorte gesehen, welche ausschließlich der Unterhaltung, dem Networking, beziehungsweise Spiel- oder Bildungszwecken dienen. Aus heutiger Sicht ist jedoch das volle Potential von virtuellen Welten noch lange nicht ausgeschöpft. Dies ist vor allem darauf zurückzuführen, dass sich die überwiegende Mehrheit aller virtuellen Welten auf Kinder und Jugendliche fokussiert, welche virtuelle Welten in wachsendem Maße in ihren Lebensalltag integrieren.

Innovationen sind heutzutage ausschlaggebend für unternehmerischen Erfolg und wirtschaftlichen Wohlstand. Aus diesem Grund sind Unternehmen auf Innovationen angewiesen, um einerseits wettbewerbsfähig zu bleiben und andererseits um neue Lösungen für bestehende Probleme zu finden. In den vergangenen Jahrzehnten hat sich der traditionelle Innovationsprozess, von einem Hersteller dominierten und induzierten Prozess, zu einem Prozess entwickelt, bei dem nunmehr Konsumenten und Hersteller gemeinsam und interaktiv, während des gesamten Innovationsprozesses zusammenarbeiten um neue und bessere Produkte, Prozesse und Dienstleistungen zu entwickeln. Als Konsequenz, müssen sich Unternehmen nun neuen Herausforderungen stellen, einschließlich stetig komplexer, internationaler und kooperativer werdender Arbeitsmuster. Darüber hinaus sind Unternehmen ständig auf der Suche nach neuen Wegen und Werkzeugen, welche die Zusammenarbeit und Interaktion mit Kunden während des gesamten Innovationsprozesses ermöglichen, vereinfachen und gleichzeitig auf die Bedürfnisse beider Parteien Rücksicht nehmen.

In diesem Zusammenhang repräsentieren Avatar-basierte Innovationen vielversprechende Innovationstreiber, da sie einen global vernetzten Arbeitsraum für offene Innovationsprozesse bieten. Die Verwendung von Avataren und virtuellen Welten ermöglicht eine noch nie dagewesene Form von webbasierter Zusammenarbeit, während des gesamten Innovationsprozesses. Darüber hinaus ist die Kombination von Avataren, virtuellen Umgebungen und webbasierten Anwendungen ausschlaggebend dafür, dass virtuelle Welten als eine qualitative gleichwertige Alternative, zu realen Arbeitsumgebungen gesehen werden können, wenn es gilt eine passende Umgebung für ein Innovationsprojekt zu finden.

Die vorliegende Masterarbeit gibt einen Überblick über die jüngsten Entwicklungen im Bereich der virtuellen Welten. Stellt die drei Kernbereiche von Avatar-basierten Innovationen dar und analysiert anhand von drei ausgewählten Fallstudien, wie Unternehmen virtuelle Welten und Avatare während der verschiedenen Phasen des Innovationsprozesses verwenden können.

APPENDIX D: Curriculum Vitae (German)

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Ausbildung

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- Sep. 2003 - Juni 2008: **Hertha Firnberg Schulen für Tourismus und Wirtschaft**
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- Mitarbeit bei wissenschaftlichen Forschungsprojekten und Publikationen
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- Verantwortlich für den Ausbau des Weiterbildungsbereichs
- Organisation von Karriereveranstaltungen mit postgradualem Programmschwerpunkt
- Akquise von internationalen Universitäten & Ausstellern vor allem auf Eng/Fr/Sp
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- Organisation der LL.M. Night und Postgraduate Area / UNI SUCCESS12
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BERLITZ Austria GmbH (Front Desk Coordinator, Teilzeit 30h/W.), Wien

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Club Hotel Giverola (Rezeptionistin), Tossa de Mar, Katalonien, Spanien

- Annahme und Eingabe von Reservierungen (Software: Fidelio)
- Mitarbeit bei der Organisation und Durchführung von Seminaren & Events
- Gästebetreuung: Begrüßung, Check-In, Information, Check-Out
- Administrative Aufgaben: Verrechnung und Kontrolle der Konsumationen und Aufenthalte, Erstellung d. Planungslisten (Roomservice, Küche, Restaurant), Telefon- und Emailbeantwortung, Korrespondenz, etc. ...

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Publikationen

- Novak, N. M., Mladenow, A., Strauss, C. (2013): „Avatar-based Innovation Processes – Are Virtual Worlds a breeding ground for Innovations?“. ACM International Conference Proceedings of the 15th International Conference on Information Integration and Web-based Applications & Services (iiWAS2013), 2-4 Dezember 2013, Wien, Österreich. (Submitted Paper).

Präsentationen

- Mladenow, A., Novak, N. M. (2013): „Was kostet deine Reise in die virtuelle Kinderwelt?“. 11. Kinderuni Wissenschaft, 17. Juli 2013, Wien, Österreich.

Kompetenzen

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- Englisch** (verhandlungssicher)
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- MS Office, Adobe Photoshop, SPSS, SQL, HTML, Joomla, Netzwerktechnik
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- Schulsprecherin & Mitglied des Schul-Gemeinschafts-Ausschusses (2006-2008)
- Geschäftsführerin „Talk’n’Travel“ – Junior Unternehmen (2006)
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