

## **Final Scientific/ Expert Report on Virtual World Entrepreneurship**

A look at Entrepreneurs in the Nordic Region Exploring the Use of Virtual Worlds for Entrepreneurial Activity

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# **Final Scientific/ Expert Report on Virtual World Entrepreneurship**

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## **A look at Entrepreneurs in the Nordic Region Exploring the Use of Virtual Worlds for Entrepreneurial Activity**

### **NVWN Milestone 11 NVWN Work Package 3: Entrepreneurship September 2011**

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## **Executive Summary**

*This report reviews our approach, case studies, results, and implications for the NVWN Work Package 3: Entrepreneurship, and it is written with practitioners and policymakers in mind. We base our work on the concepts of affordances, or the material and social properties of any technology in relation to affording actions to humans, of the 3D web (or 3D internet) or virtual worlds (hereafter noted with the term VWs), social networks, and the diffusion or spread of innovation. We conducted seven case studies through qualitative interviews with entrepreneurs across three sectors working with VW internet technologies: 1) film and multimedia, 2) health care, and 3) high-tech industries. The entrepreneurs are located in or have strong connections to the Nordic region, e.g., Nordic citizens living abroad, and are all internationally oriented. The results of the case studies of entrepreneurs highlight three different aspects related to working with VW technologies: 1) VW affordances, 2) the importance of social networks, and 3) virtual collaboration in complex project teams.*

*1) The **affordances** that VWs offer (or afford)<sup>1</sup> according to our cases, relate to the basic needs and aims of entrepreneurs in regards to the communication of ideas and plans, collaboration, creation of value, and organization of economic activity. The questions we posed entrepreneurs in the case studies explore the relation of VW affordances to their specific entrepreneurial activities. The unique affordances of VWs described by entrepreneurs are categorized in three areas: a) flexibility, b) simulation, and c) visualization. Additionally, there are overarching challenges for affording interaction in today's "virtual worlds" including poor usability and compatibility, low-resolution graphics, unstable technical performance, and the association of commercial virtual worlds with fun, porno, and games. However, the affordances of VWs can be seen as "potentials" meaning that they have the capacity to become "next" practices or lead to future success or usefulness even though the potentials of any technology are not controllable or predictable. Prahalad and Ramaswamy (2003, 2004)<sup>2</sup> discuss the potentials in next practices of innovation and suggest a shift of focus away from products and services and towards experience environments supported by a network of companies and consumer communities.*

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<sup>1</sup> The term affordances was introduced by Gibson (1979) and refers to how different affordances of an object allow for different types of actions, such as how a door handle allows for the opening of a door. Norman (1998, 1999) applied affordances to the field of usability design.

<sup>2</sup> C. K. Prahalad and V. Ramaswamy (2003) The New Frontier of Experience Innovation. MIT Sloan Management Review. 44(4). <http://sloanreview.mit.edu/the-magazine/2003-summer/4442/the-new-frontier-of-experience-innovation/>; C. K. Prahalad and V. Ramaswamy (2004) Co-creation experiences: The next practice in value creation. Journal of Interactive Marketing. 18(3): <http://onlinelibrary.wiley.com/doi/10.1002/dir.20015/abstract>.

2) **Social networks** play an important role for the exchange and acquisition of knowledge and resources between entrepreneurs and for co-creation processes<sup>3</sup> between entrepreneurs and those who use their company's products and services. In the open-source software<sup>4</sup> movement in particular, there seems to be a reliance on networks for co-creation and the development of the best ideas. Social networks are used to gain knowledge about funding strategies, technical know-how, legal advice on intellectual property (IP), and cooperation with business partners about the distribution of their goods and services. Such social networks co-create contents in VVs as well as collaborate, such as on open-source software and standardization of formats. However, this collaboration and development are accompanied by difficult legal, proprietary issues concerning copyright and IP (intellectual property).

3) Entrepreneurs are dependent upon developing **virtual collaboration** skills involving the distributed management of complex, global projects and project members across multiple media platforms. The entrepreneurs utilizing VVs are inter-disciplinary, multi-cultural, and they have to negotiate complex economic issues. This entails a "spaghetti"<sup>5</sup> type of organization of work<sup>6</sup>.

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<sup>3</sup> Co-creation is an important aspect of how activities and interactions work on the internet. The term refers to open source development and to work by Prahalad, who introduced the concept in a wider context Prahalad and Venkat Ramaswamy (2003). It also refers to the value to a company when goods and services are increasingly co-created by the company and the customer. Hence, the focus is not only on what is going on inside the company, but rather what is taking place when the members of the company interact with customers.

<sup>4</sup> Examples of free, open source software include the GNU General Public License (GNU GPL), It is a widely used free, open source software license developed since the 1980s. It *affords freedom* - anyone can use, change, share software for any purpose: <http://www.gnu.org/licenses/quick-guide-gplv3.html> Another example is Berkeley Software Distribution (BSD) developed by researchers at the [University of California, Berkeley](http://www.berkeley.edu), from 1977 to 1995. BSD often refers to its descendants: [http://en.wikipedia.org/wiki/Berkeley\\_Software\\_Distribution](http://en.wikipedia.org/wiki/Berkeley_Software_Distribution)

<sup>5</sup> The term "spaghetti organization" was coined by Lars Kolind, entrepreneur and former CEO of the Danish company Oticon, to describe the fluid organization of work. Kolind (2006) *The Second Cycle: Winning the War Against Bureaucracy*. Pearson Prentice Hall. Kolind blogs on entrepreneurship: <http://kolindkuren.dk/om-forfatteren/> and contributes to conferences on social entrepreneurship and business innovation such as: <http://rebuild21.org/>.

<sup>6</sup> Qureshi, S., M. Liu, et al. (2006). "The Effects of Electronic Collaboration in Distributed Project Management." *Group Decision & Negotiation* 15(1): 55-75.

Litsikakis, Dimitrios (2009) Virtual Project Management (VPMModel): Best practice for Project Management in the Virtual World [Internet]. Version 4. Knol. 2009 Jul 8. Available from: <http://knol.google.com/k/dimitrios-litsikakis/virtual-project-management-vpmodel/3ib8exvrc87n4/9>.

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# 1. Introduction

This report is concerned with case studies or exemplary practices in VW entrepreneurship. The focus is on the specific cases and concrete developments regarding the aspects of affordances, social networks, and the complexity of virtual collaboration. The approach taken by the entrepreneurs in our sample is largely open source because we find that the open source development offers great promise and deserves more attention. In this manner, we also follow in the footsteps of Prahalad and Ramaswamy (2004), von Hippel and others who focus on open source<sup>7</sup>. Moreover, it is important to note that we do not limit ourselves to any one specific media platform, such as Second Life by Linden Lab, rather we are “platform agnostic”. Our aim is to show the breadth of approaches and to orient ourselves toward the future, which might include a so-called 3D Internet, i.e., offering an illusion of a three-dimensional space, that is seamless, i.e., opens from your Internet browser such as Firefox, and built on open-source software, such as WebGL<sup>8</sup>. However, while we do not make any predictions for the future, we propose that these are trends worthy of further exploration.

The underlying theories we draw on here involve the diffusion of innovation and technology, and relate to how technologies emerge and how innovators, such as entrepreneurs, utilize new opportunities for creating ventures. The changes in technology affordances can be seen as dynamically intertwined with societal development at large, such as the way in which the Internet is altering the dynamics in our communication and interactions with each other. Entrepreneurs impact society not only by creating their own businesses and economic profit but also by contributing to new economic “ecosystems”, such as the open source software ecosystem. Thus, the case studies showcase small-scale entrepreneurial projects that are at the forefront of developments regarding the use of VW technologies with certain characteristics of a 3D Internet. The larger impact on society and considerations for policy are then discussed in the last section of the report.

This final expert report follows on the report “Selection of best entrepreneurship practices in relation to the emerging 3D Internet” Milestone 06 (M06), submitted to the project’s co-financier, the Nordic Innovation Center (NICE) on September 1, 2010. The overall objectives of WP3 are to develop an *understanding of state-of-the-art entrepreneurship activities in VWs*

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<sup>7</sup> The open source (OS) business model represents a dramatic shift in how companies can be understood and managed. Collective effort and social interaction are crucial to the development of OS, for instance Raymond (2000) highlights that the OS movement has been shaped by a strong sense of community. Bagozzi and Dholakia (2006) identify similarities between the OS movement with its user groups and the cornerstones of “community”.

<sup>8</sup> WebGL (*Web-based Graphics Library*) is a cross-platform, royalty-free web standard for low-level interactive 3D graphics within any web browser.

and to investigate *best practices in entrepreneurship in VW business and other fields*, e.g., higher education, NGOs, through a) *literature reviews* and b) *case studies of entrepreneurs* physically located in Nordic region and entrepreneurs in various VWs. An extensive literature review and arguments for a focus on creative industries as drivers of innovation is found in our previous report, (M06). In this report, we cover point b) *case studies* in three sections:

1. Our approach to research on entrepreneurship and VWs
2. Presentation of the cases
3. Implications and discussion

There is also an extensive appendix that provides more insight into the case studies and our approach. In addition, the video on the seminar “Cross-media Storytelling”<sup>9</sup> includes discussion about the case *My Avatar and Me*.

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<sup>9</sup> Seminar at Roskilde University, December 1<sup>st</sup> 2011. A video with highlights from the event will be available 2012 online. The seminar included a talk by Lisbeth Frølund, film showing of *My Avatar and Me*, and a panel discussion about filmmaking. The video also includes excerpts from an interview with the film’s co-directors Bente Milton and Mikkel Stolt.

## 2. Our Approach to Research on Entrepreneurship and VWs

Entrepreneurship has been studied across a variety of research traditions, such as business, computer science and public science (Landes, Mokyr, & Baumol, 2010; Tellis, 2009) and has been recognized as a major force in the global economy. In general, definitions of entrepreneurship focus on *establishing new enterprises*, introducing new products and/or entering new markets (Schumpeter, 1934; Gartner 1988; Mosted 1991; Amit, Glosten, & Muller 1993). From an international perspective, McDougall and Oviatt (2000) stresses that entrepreneurship involves risk-seeking behavior that crosses national borders and is intended to *create value in organizations*.

When entering the field, we as researchers confronted three major challenges in terms of conducting qualitative research on entrepreneurship and VWs:

- 1) *The lack of and/or fragmentation of knowledge due to the relative infancy of the VW field and its interdisciplinary nature across many research fields.*
- 2) *The fluid definitions of terms regarding "virtual worlds" and the 3D Internet.*
- 3) *The difficulty of getting an overview and determining a few, relevant activities to explore as case studies.*

The three challenges were dealt with as follows:

- Building knowledge in this emerging field by harnessing our own inter-disciplinarity as researchers and exploring entrepreneurship research across fields, e.g., social sciences, humanities, computer science.
- Simplifying the definition. While the definitions of the 3D internet/web and VWs are widely debated by the practitioners and within academia, including the Nordic Virtual Worlds Network and the Danish "Virtual Worlds Sense-making and Innovation" research project<sup>10</sup>, we chose to use a simple definition of a "virtual world" by Mark W. Bell: "a synchronous, persistent network of people, represented as avatars, facilitated by networked computers."<sup>11</sup>
- Viewing the virtual as NOT contradictory to embodied "realness" or "real life", rather, it is *different*. Miller points out that the idea of the virtual is often limited to

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<sup>10</sup> The Virtual Worlds Sense-making and Innovation project is a strategic research project based at Roskilde University and Copenhagen Business School. Blog: <http://worlds.ruc.dk/>.

<sup>11</sup> Historical perspectives, definitions are on: [http://en.wikipedia.org/wiki/Virtual\\_world](http://en.wikipedia.org/wiki/Virtual_world).



ideas of virtual reality, virtual economics or virtual worlds – and suggests instead bringing the virtual into a wider context of the nature of objects that exist yet are virtual. Thereby, the virtual refers to the *intangible and immaterial*, such as the virtual nature of communication, services, or virtual artifacts or products such as avatar designs.

- Suggesting integration of the "fun" or playful with "serious" uses since many businesses using VWs currently offer real-time entertainment services, socializing or training, including commercial role-playing games, distinct virtual worlds, virtual conferences, teaching (such as language instruction offered in the Danish virtual world *Mingoville*<sup>12</sup>), simulations for training (such as training medical staff in one of our cases, Parvati Dev's *Innovation in Learning*). This suggests that the social, educational, and "fun" aspects offer valuable examples for others to follow. They open our eyes for the growth potential of immersive, interactive VWs. This "fun" factor creates a dilemma, however, since on the one hand, it inspires and offers examples of success as a "space" for entrepreneurial practice, yet on the other hand, there is still be a perception by many of virtual worlds as spaces for games, dating and porn.
- Presenting an overview of next practice. As discussed in our previous M06 report, our attention was on how to pick up the so-called early signals and trajectories of growth patterns of future or "next practices", rather than an evaluation of the present-day "best" practices. Thereby, themes for the cases of entrepreneurial activities/practices became clearer, especially the richness in the creative industries.

## Theoretical Background

In our study of entrepreneurs using VW technology, we are primarily interested in two questions, which therefore lay the groundwork for our case studies:

- *What does the 3D immersive Internet/VW technology offer or afford as a "space" for entrepreneurial practices?*
- *How do entrepreneurs utilize their social networks to learn to deploy the 3D Internet?*

However, before proceeding to our case studies designed to help us investigate these two questions, it is important that we present the two primary theoretical perspectives that

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<sup>12</sup> Mingoville offers free English language instruction to children. Produced for the international market by Dansk e-Learning Center. <http://www.mingoville.com>

enlightened our investigation: 1) the “Diffusion of Innovations” and 2) the sociocultural view of entrepreneurship.

### **Diffusion of Innovations**

We chose the “Diffusion of Innovation” perspective by Rogers<sup>13</sup> due to its focus on the process of social change with regard to the qualities, or affordances of a new technology. Innovation for the purpose of this report is synonymous with the emerging technology of the 3D Internet/ virtual worlds, and Rogers (2003) emphasizes the following with regard to the diffusion of a new technology:

- The particular qualities that make an innovation spread successfully (or fail to spread).
- The importance of peer-to-peer conversations and peer networks in diffusion.
- The understanding of the needs and habits of different user segments or “adopter categories”.

The Diffusion of Innovations takes a different approach to most other theories of change, and it is useful for understanding how people, whether positioned along the spectrum of “the entrepreneur” or “the user”, decide to use an innovation. Change is primarily viewed as evolution or “reinvention” of products and human behavior with products so that technologies *fit* better or *afford* the basic needs of individuals and groups at a given time. The innovations themselves are in focus in terms of how innovations change over time as people adopt and adapt them according to a *fitness of purpose*. The primary question is: what does the new technology enable entrepreneurs and users to do? Diffusion scholars recognize five *qualities*, or what can also be called the particular affordances of an innovation, that determine the success of its adoption: 1) relative advantage, 2) compatibility with existing values and practices, 3) simplicity and ease of use, 4) trialability, and 5) observable results.

Rogers’ perspective thus helps to understand the affordances that entrepreneurs are dealing with when they work with any particular media platform, e.g., type of virtual world or 3D Internet, and their attempts to generate value creation through their activities. The question of value creation for entrepreneurs concerns the relative advantage, simplicity and ease of use, and trialability of a media platform or what it enables in terms of business models and their compatibility with existing values and practices as well as the resulting observable results.

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<sup>13</sup> Rogers, Everett. *Diffusion of Innovations* (Fifth edition, 2003), New York: Free Press. See also Les Robinson’s review (2009) on: [www.enablingchange.com.au](http://www.enablingchange.com.au).

## Sociocultural View of Entrepreneurship

The sociocultural perspective leads to a focus not on the individualistic entrepreneur, e.g., not on the entrepreneur's psychological profile of risk or educational background, but to a focus on the entrepreneur as situated in a wider sociocultural context<sup>14</sup>. The entrepreneur is seen as an actor within his or her local cultural context and as a participant in a variety of overlapping and distinct social networks. This sociocultural view provides a more holistic view of a phenomenon enabling researchers to look for signals of change, convergence and divergence, indicating potential future directions.

With regard to VWs, in-world (internal virtual world) economies can be seen as somewhat separate, distinct spaces for activity, such as in the concept of *avapreneur*<sup>15</sup> (Teigland 2010) that combines the avatar (the representation of self in a virtual world, game or simulated computer graphic environment) and entrepreneur. This avapreneurship has already received a great deal of attention, such as PeaceTrain (in Teigland 2010) and Metaverse TV<sup>16</sup>, and showcases avapreneurs such as Frolic Mills' BOSL media enterprises and many other fascinating examples of broadcasting that are mainly "in-world". A somewhat broader view could then focus on the distinct "in-world" economies, their in-world currencies, and the value creation and opportunities for entrepreneurs and small businesses, such as "within" the Second Life economic "ecology" with its Linden dollar currency. While this division of in-world from offline can help to make entrepreneurial affordances of VW technology clearer and is indeed a rich area for research, it does not provide a holistic view of the interconnected dynamics of entrepreneurs acting in both in-world and offline networks. Thus, our approach aims to understand both the online and offline networks and economic activity as intertwined parts of a whole eco-system inspired by sociocultural traditions, such as science and technology studies. This is also in line with a recent literature review of "Virtual Environment Studies" in relation to social and group phenomena (Sivunen & Hakonen, 2010)<sup>17</sup> that found that the framing of research in the VW field is often narrow. The authors

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<sup>14</sup> Drakopoulou Dodd, S., & Anderson, A. R. (2007). Mumpsimus and the Mything of the Individualistic Entrepreneur. *International Small Business Journal*, 25(4), 341-360.

<sup>15</sup> Teigland, R. (2010). Born Virtuals and Avapreneurship: A case study of achieving successful outcomes in Peace Train – a Second Life organization. *Journal of Virtual World Research*, 2(4), 24. Retrieved from <https://journals.tdl.org/jvwr/article/>

<sup>16</sup> <http://metaversetv.com/>

<sup>17</sup> Sivunen, A., & Hakonen, M. (2010). Review of Virtual Environment Studies on Social and Group Phenomena. *Small Group Research*

therefore suggested expanding cases to look for macro-level phenomena, such as leadership and intergroup relations in order to leverage and broaden the field.

Insights from a sociocultural theoretical perspective also include economics since economics is so central to understanding entrepreneurship. The traditions of copyright and the changes toward a “new networked economy” discussed by the economist Yochai Benkler (2006) are relevant for our discussion of the importance of sharing not only in the context of open-source software but also in the sharing and opening for social *frames of meaning*—how meanings are shaped and by whom. Benkler’s approach to the networked economy aligns with Lawrence Lessig’s (2008) work regarding issues of copyright control, innovation, freedom and creativity in the public and private domains. Benkler and Lessig both suggest that our new networked information economy, such as the DIY (do it yourself) movement in multimedia production, offers opportunities due to the affordances of the Internet for networking and the wide access to tools for cross-media production.

The freedom to use and share experience in networks appears to be key for entrepreneurial “next practices” in VWs, whether for profit or nonprofit purposes. As Benkler notes, “The practical capacity individuals and non-commercial actors have to use and manipulate cultural artifacts today, playfully or critically, far outstrips anything possible in television, film, or recorded music as these were organized throughout the twentieth century” (Benkler, 2006: 276). Entrepreneur Chris Anderson points out that organizations will need to embrace a radical openness of input from users, or “Crowd Accelerated Innovation”<sup>18</sup> in order to tap into the power of new media. This openness, in our view, is a primary indicator and signal of possible “next practices” in entrepreneurship in the field of VWs.

## **Selection of Cases**

In line with the above perspectives related to the diffusion of innovation and entrepreneurship, we view online and offline social networks as holistic, i.e., inseparable, and do not focus on avapreneurs within one virtual world. While there are obviously unique individual entrepreneurs in the case studies herein, our view on these is social and cultural. We view our selected entrepreneurs as situated in their Nordic or other cultural contexts and as participants in various social networks and collaborations, both online and offline.

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<sup>18</sup> Chris Anderson created the private non-profit Sapling Foundation that runs TED talks. His presentation on web video: [http://www.ted.com/speakers/chris\\_anderson\\_ted.html](http://www.ted.com/speakers/chris_anderson_ted.html)

Furthermore, the approach and selection of our in-depth cases was chosen with the aim to explore and illustrate a sample of the variety within entrepreneurship “next practices”, such as how the entrepreneurs secure funding (private / public) and what sorts of services/products they develop. We were interested in entrepreneurs who are seeking opportunities in “alternative markets,” and especially those who are experimenting with open-source software. This meant that we did not include entrepreneurs who are designing unique, closed virtual worlds, e.g., games. Game development is an area that has already been covered extensively by others, such as the Nordic Game Program<sup>19</sup>. However, game design (platform to be decided) is an aspect of one of the cases, *Granny’s Dancing on the Table*. Thus, we have selected our industries and cases such that we maintain a focus that goes across the entrepreneurial activities online and offline, or outside or inside (or “in-world”) in various virtual worlds.

Furthermore, an important distinction is made between a proprietary platform, such as Second Life owned and run by Linden Lab, and the open-source based platforms, the Sirikata platform by KataLabs or Unity Technologies. We selected cases to explore the relative advantage of open source with its adaptability to fit the purpose of the entrepreneur and his/her needs for economic flexibility. While Second Life does offer possibilities of re-using contents as public domain, it allows only a limited re-use of the software code<sup>20</sup> and content export.

We chose seven cases in the 1) multimedia, 2) health care training and 3) high-tech (with a mix of development and consultancy) industries. The cases can be said to fall within a very broad definition of “creative industries”, a somewhat bureaucratic and disputed term that varies from country to country. Overall this term can be said to refer to the *creation and exploitation of intellectual property* such as art, film, music, dance, theatre, advertising, broadcast media, software development, and computer and related services. The consultancy and training area falls somewhat further into related services, rather than the core of creative industries. All the cases involve Nordic citizens as entrepreneurs as the leaders or co-leaders except Innovations in Learning (IIL). However, while this company is not Nordic, it uses the

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<sup>19</sup> The Nordic Game Program includes the conferences, activities at international games industry events, as well as Nordic game development support, information and infrastructure activities. It receives funding from the Nordic Council of Ministers: <http://nordicgame.com/>.

<sup>20</sup> It is possible to export some graphic content from SL to the so-called OpenSimulator (OpenSim) platform since the *viewer* in SL is *open source*. There is a loss of graphics (such as textures) from SL. OpenSim aims at “innovative directions towards becoming the bare bones, but extensible, server of the 3D Web” using BSD permissive free software licenses. [http://opensimulator.org/wiki/Main\\_Page](http://opensimulator.org/wiki/Main_Page).

Unity game engine and has strong ties to Unity Technologies<sup>21</sup>, a company based in Copenhagen with a San Francisco branch<sup>22</sup>. The seven companies are included because of the variety in their approaches because they are among the leaders in their industry in terms of the use of VWs/3D technologies.

#### **Film- and Multimedia industry:**

- *My Avatar and Me*, co-directed by Mikkel Stolt, Fenris Film & Multimedia ApS, and Bente Milton, Milton Media ApS, DK.
- *Granny's Dancing on the Table*, writer/co-director Hanna Sköld, Tangram Film, SE
- *Gzim Rewind*, writer/director Knutte Wester, SE.

#### **Health care Industry:**

- *BE community*, researcher and co-developer Mette Terp Høybye, DK/US, leads project within the cancer treatment wards for youth at University Hospital Aarhus and Rigshospitalet (University Hospital Copenhagen) and in connection with partner Sirikata/Katalabs, DK/US.
- *Innovation in Learning*, researcher and co-developer Parvati Dev, IN/US in connection with partners such as Unity Technologies, DK/US.

#### **High-tech and Consultancy Industry:**

- *Katalabs*, developer and CEO Henrik Bennetsen, DK/US. Katalabs develops the *Sirikata* platform and is connected with Google's network of entrepreneurial developers working with the new Chrome browser. Katalabs cooperates with Mette Terp Høybye, DK/US, on the BE Community project.
- *Train for Success*, developer and consultant Anders Grönstad, SE/US.

Furthermore, we based our selection on the fact that the creative industries are fast growing and often drivers for other industries. In addition, creative industries offer excellent exemplary "next practices" for entrepreneurs who are developing services and products via emerging technologies and VWs because the creative industries often spearhead changes in

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<sup>21</sup> Unity is an authoring tool for video game development across platforms. The company Unity Technologies offers two types of licenses for the Unity tool: *Unity* and *Unity Pro*. The non Pro version is free. See <http://unity3d.com/>.

<sup>22</sup> Unity Technologies was started in 2003 by three entrepreneurs in Copenhagen, David Helgason (CEO), Nicholas Francis (Chief Creative Officer) and Joachim Ante (Chief Technology Officer). Their vision was to democratize game development by enabling everyone to create rich interactive 3D. Article on winning tech awards 2010: <http://www.reuters.com/article/2010/07/15/idUS199236+15-Jul-2010+MW20100715>.

work practices. The creative industries at large consist of many entrepreneurial and auto-didactic (self-taught) people, and there is a culture of innovation and risk-taking since it is important to be open to experimentation and to constantly renew yourself and your skills. It is a highly international, competitive field.

The creative industries are often in focus for policymakers in the Nordic countries, and the Nordic Innovation Center has funded a number of studies of the creative industries. The reason is that they are considered innovative and lead to an increasing export of games, toys, films, music, product design, fashion, architectural expertise etc. Creative industries also reportedly stimulate different industries, such as tourism and biotech. The innovation potential in the creative industries has strategic focus, for instance as reported by the Danish institute FORA<sup>23</sup> and projects such as “Experience Zones”<sup>24</sup>

## Methods

We developed a case study template based on our two overarching questions on affordances and social networks, to allow us to conduct interviews that are similar, to present the cases in a common framework, and to do a within and cross-case analysis using coding. The two main questions are the building blocks for the interview guide (see Appendix I), and we asked questions falling within five major areas in our interviews that also guided our coding: 1) what is the main entrepreneurial idea, 2) how did the vision arise, 3) how are the affordances of VWs leveraged, 4) what sorts of social networks are utilized, and 5) what are the future plans for the company.

The interviews are semi-structured, meaning that themes in the conversation affect the flow and sequence of questions during the interview process. The specific interview guide with a list of interview questions is available in Appendix I. Our five categories were by no means rigid; rather they served as a way to see patterns and interrelations across the cases. They are intended as a way to simplify the complexity in the data but not to reduce it.

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<sup>23</sup> FORA is the Danish Enterprise and Construction Authority's division for research and analysis. A recent report concerns creative industries and technology: <http://www.foranet.dk/>

<sup>24</sup> The *Centre for Culture and Experience Economy* (CCCE in English, CKO in Danish) was founded in 2008 by the Danish government to improve the cooperation between culture, business, universities and research institutions in the field. Another cooperative initiative is Experience Zones within areas: fashion (closed 2011), computer games, food culture, and music. Each zone runs independently, such as the *Computer Game Zone*: <http://danishgameindustry.com/>

## Case Study Template

<b>Description of the Case</b>
<ul style="list-style-type: none"><li>• Time/history/website</li><li>• Ownership/sector/size</li><li>• Product or service</li><li>• Profit or non-profit</li><li>• Physical location</li></ul>
<b>Vision of the Entrepreneur</b>
<ul style="list-style-type: none"><li>• Strategy</li><li>• Business or development plan</li></ul>
<b>Affordances of the Specific 3D Internet or VW “Spaces” Used</b>
<ul style="list-style-type: none"><li>• Reason for using the selected VW / 3D platform / media solution</li><li>• Deployment issues and challenges</li><li>• Unique affordances (what VW offers or allows)</li></ul>
<b>Utilization of Social Networks</b>
<ul style="list-style-type: none"><li>• Networks (social, but could include economic aspects of funding, distribution)</li><li>• Partnerships (collaboration)</li><li>• Knowledge sharing</li><li>• Sources for help/inspiration</li></ul>
<b>Vision for the Future</b>
<ul style="list-style-type: none"><li>• Future plans for deployment and development</li><li>• Business/project dreams or ideas</li></ul>

## Data Collection and Analysis

We collected and analyzed data through the following steps:

1. In-depth qualitative interviews for 7 cases, 8 interviewees (2 interviewees for *My Avatar and Me* case). The interviews were conducted as voice and text chat via skype, Second Life, or as face-to-face meetings. Five of the eight interviewees were interviewed twice, both to



give time to gather secondary data and to keep each interview down to one hour's length. Interviews (approximately 13 hours in all) were transcribed verbatim later with text chat inserted.

2. Virtual ethnographic and secondary data methods to follow the interviewees' online business ventures and use of emerging technologies. This includes studying the online businesses including their websites, joining community sites, and following blogs. Interviewers also attended events and presentations by the interviewees about their business, both virtual (online) and physical (offline or mixed reality).

3. Analysis: coding of key themes (narrative, discursive).

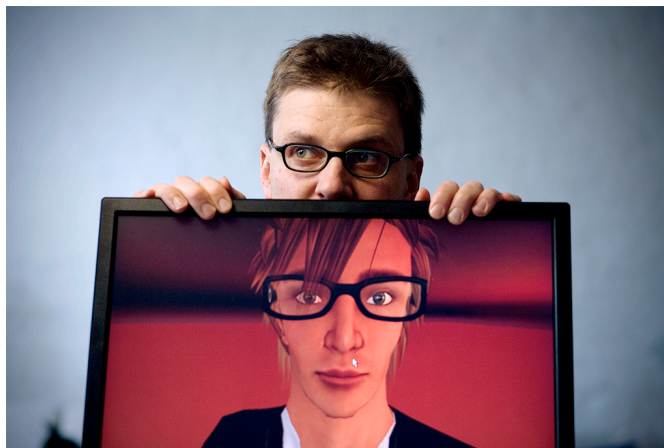
The steps in our data collection and analysis led to the presentations and preliminary results in this report. We continue with our cross-case analysis and are in the process of writing and publishing the results in academic journals and plan on dissemination of results to practitioners (see Appendix II.).

### 3. Presentation of Case Studies

The seven cases span three sectors as outlined earlier. The summaries are presented in order to give the reader an overview of each case.

#### Film- and Multimedia Industry

##### Case Study 1: My Avatar and Me, Co-directors Bente Milton, Milton Media ApS and Mikkel Stolt, Fenris Film & Multimedia ApS, DK



*The image above is a still showing the main character of My Avatar and Me as "real" and as avatar. The full-length film integrates machinima scenes, captured in SL, with live action footage in a documentary style. However, the film is mainly a fictional story. The co-directors have their own companies, [www.miltonmedia.com](http://www.miltonmedia.com) and <http://www.fenrisfilm.dk/> (see also <http://myavatarandme.com/>). The film involved many collaborators, including avatar performers.*

#### Description of *My Avatar and Me*

- The feature film *My Avatar and Me* (2010) is written and co-directed by Danish Bente Milton, Milton Media ApS and Mikkel Stolt, Fenris Film & Multimedia ApS. The production was funded through the New Danish Screen program, MEDIA (EU), TV stations ARTE, ZDF and YLE<sup>25</sup>.

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<sup>25</sup> New Danish Screen [http://www.dfi.dk/branche\\_og\\_stoette/new-danish-screen.aspx](http://www.dfi.dk/branche_og_stoette/new-danish-screen.aspx); MEDIA is EU's program for the European audiovisual industry [http://ec.europa.eu/culture/media/index\\_en.htm](http://ec.europa.eu/culture/media/index_en.htm)

<ul style="list-style-type: none"> <li>The main character is Stolt, who is portrayed as somewhat of a failed, small-time filmmaker. He hopes to earn money in Second Life as a filmmaker. In the course of the film, he also becomes romantically interested in another avatar "Helena". The film shows his double roles as the documentary filmmaker Mikkel Stolt with live action in the "real world", and the filmmaker/avatar Mike Proud in SL.</li> </ul>
<b>Vision of the Entrepreneur</b>
<ul style="list-style-type: none"> <li>The vision includes presenting a sense of parallel worlds, crossing between live action in "spaces" of Copenhagen, Paris, California and various SL settings. The film includes many machinima scenes of Stolt as an avatar, and some scenes where he appears at the same time as a "real" character and an "in-world" avatar.</li> <li>The entrepreneurs wanted to make an entertaining, humorous film that documents its own construction as a film as well as the SL culture, which lead to questions about identity, spirituality and reality based on the phenomenon of VWs (SL) and questions about our presence, relations and emotions in these kinds of "spaces".</li> </ul>
<b>Affordances of the Specific 3D Internet or VW "Spaces" / Platforms Used</b>
<ul style="list-style-type: none"> <li>The film team worked closely with the leading avatar "Helena" and with others, including Danish Kean Kelly and many European-based avatars. The advantage of using avatars in the same time zones was important. Instructions for performances were done via text (not voice).</li> <li>There was no recorded voice for the avatars used in the film, only music. In addition, the live character Mikkel Stolt narrates the events in SL as "voice-over".</li> <li>New locations (SL spaces called SIMs) were designed, or adapted from existing locations for use as a virtual film studio-SIM for the film. The locations in SL often resembled the real world film locations and afforded telling the story.</li> <li>The main character and his relation to his avatar is central, yet the film also showed other characters / avatars communicating in a sort of virtual "world within a world".</li> <li>The premiere at the DOX:BIO program included a mixed reality event, a simultaneous film showing in SL and interviews with the avatars from the film "in-world". This was shown live at a cinema in Copenhagen. This event offered a unique insight into the experience of co-presence when crossing the "virtual and real" in real-time.</li> </ul>
<b>Utilization of Social Networks</b>

- Jeppe Raasthøj of Fenris Film & Multimedia ApS solved many technical issues in order to shoot high-resolution footage from SL. The aim was to have the machinima film sequences intertwine with the live action shots and characters in order to give an impression of blending of avatar and live characters. Another important film team member was Rob Gould, UK, [www.deviantmedia.co.uk](http://www.deviantmedia.co.uk), who appears as an avatar filmmaker and a live action filmmaker. Gould and Stolt initially met virtually in SL in the early stages of filmmaking, thereby Gould joined the team as a live action character as well as an avatar and assisted with machinima camera work.
- A wide network of collaborators in SL contributed both “con amore” (out of zeal, at no cost) and others were paid for their time as avatar performers, or set designers, for the SL machinima scenes. Live action characters included a consultant from the Danish Film Institute, a well-known Danish DJ ”Master Fatman”, Danish environmental activists, entrepreneur John ”Pathfinder” Lester (formerly from Linden Lab, who own and run SL), Tibetan Buddhist Lakha Lama, and [Danny Hillis](http://longnow.org/clock/) as a spokesman for The Long Now Foundation <http://longnow.org/clock/>.

#### **Vision for the Future**

- The Danish Film Institute has selected the film for introduction at key film festivals<sup>26</sup> and the film continues to do well in terms of TV distribution across Europe.
- Stolt, Raasthøj and Gould are currently planning another cross-media project and fundraising. They still communicate frequently via SL and in real life.
- Milton is planning an international cross-media project as well.

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<sup>26</sup> Boysen, Katrine Sommer. My Avatar and Me. Nov 2010. *Film #70* Amsterdam. A special issue about Danish films in competition at IDFA Festival, Amsterdam. Published by the Danish Film Institute: Copenhagen. Page 28 <http://issuu.com/detfi/docs/70film>

**Case Study 2: *Granny's Dancing on the Table*, writer/director Hanna Sköld,  
Tangram Film, SE**



*Image above is a still showing the main character of *Granny's Dancing on the Table*, a cross-media "story world" that will include a game, a film, and live events. Anyone can become co-creators by contributing with personal stories and ideas on the Facebook page or at open workshops. See [www.facebook.com/grannysdancing](http://www.facebook.com/grannysdancing) and [www.grannysdancing.com](http://www.grannysdancing.com).*

Description of <i>Granny's Dancing on the Table</i>
<ul style="list-style-type: none"><li>• The cross-media production <i>Granny's Dancing on the Table</i> is currently under development. It combines film, Facebook games and live events. It presents a fictional story exploring a crime from the past and integrates some documentation and "authentic" artifacts (e.g., photos, stories) based on a collaborative process of design, i.e., with on-going user-generated contents of the film story and upcoming online game.</li><li>• The screenwriter and co-producer, Hanna Sköld, is part of Tangram Films <a href="http://www.tangramfilm.se/">http://www.tangramfilm.se/</a>. The team of collaborating designers and producers each has his/her own company, most of which are in Malmö, Sweden, including Good World Film and Ozma Gamedesign (<a href="http://www.ozma.se/">http://www.ozma.se/</a>). Other collaborators are in Denmark, France and Italy, including scenographers, designers and musicians.</li><li>• "Granny" is currently developing the storyline in part online via Facebook, and the team holds open workshops (live events in Malmö) to brainstorm and further develop the storyline.</li></ul>
Vision of the Entrepreneur

<ul style="list-style-type: none"> <li>• The vision is to use crowd-based funding, e.g., gamers can buy “Granny Dollars” with real money or earn these dollars through contributing pictures, video, etc., and to arrange distribution via cinemas, which may involve Creative Commons.</li> <li>• The artistic intent is to make interesting stories across media platforms and involve the audience in collaborative storytelling but still to maintain artistic control.</li> </ul>
<b>Affordances of the Specific 3D Internet or VW “Spaces” / Platforms Used</b>
<ul style="list-style-type: none"> <li>• The team is currently deciding on the game platform or “virtual space” for the game. Considerations include the social possibilities and managing the micro-economy of “Granny dollars” in an evolving “story-world” with user-generated characters and a way to achieve the desirable dramatic representation and scenography.</li> </ul>
<b>Utilization of Social Networks</b>
<ul style="list-style-type: none"> <li>• The Granny team involves a wide network of international collaborators including freelancers and entrepreneurs who communicate via Skype, Google Docs, Granny Yammer and face-to-face.</li> <li>• The Granny team based in Malmö consists of Sköld, Ozma Gamedesign, Helene Granqvist from Good World Film (a co-producer of games and movies), art director Åsa Libereath, Danish co-producer and dramaturg Valeria Richter and Danish-French co-producer Marianne Slot. Swedish co-screenwriter Anna Nevander and the Italian musical composer both live in Italy, while Marianne Slot at Slotmachine (<a href="http://www.slotmachine.fr/">http://www.slotmachine.fr/</a>) lives in France.</li> <li>• The team is part of a network at Malmö University: MEDEA Collaborative Media Initiative, (<a href="http://medea.mah.se/taggar/hanna-skold/">http://medea.mah.se/taggar/hanna-skold/</a>).</li> <li>• The <i>Granny’s Dancing on the Table</i> website and Facebook site are venues are open for anyone to join for creation during 2011- 2012 and the on-going promotion of the film and game.</li> <li>• The pilot project has been awarded a first prize as a cross-media project in a competition with 100 projects from 23 countries in “Power of the Pixel” 2010<sup>27</sup>.</li> </ul>

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<sup>27</sup> Awards event with 35 min. presentation of *Granny’s Dancing on the Table*. The clip includes response from panel: <http://www.powertothepixel.com/news/uncategorized/arte-pixel-pitch-prize-winner-announced>

## Vision for the Future

- The goal is to get further financial support to realize the vision and establish a sustainable, viable financial scheme<sup>28</sup>
- The future is unknown since the aim for a participatory approach to filmmaking and experimental game-making involves uncertainty about creative contributions.
- The tradition of funding for one kind of media (such as film only) is restrictive for cross-media projects. Fundraising impedes the film and game production process, but Sköld hopes to “close the gap in trans-media” between funding organizations.
- The Swedish cinema distribution appears settled with “Folkets hus och parker”.

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<sup>28</sup> As of fall 2011, the project has received support from: Swedish Film Institute, Film I Skåne Media Desk EU grant (matching funds). They have applied to: New Danish Screen, Swedish Film Institute (for pilot), Nordic Games, First Motion, (EU Lab, Baltic Sea Region), Peaceful Fish (EU program Closing the Gap re. pitch).

### Case Study 3: Gzim Rewind, Knutte Wester, SE



*Images are film stills showing the main character Gzim at different ages and hand-drawn animation by Knutte Wester. Gzim Rewind project information is available on YouTube, via Gzim Project on Facebook, and website. For instance, the trailer can be seen on <http://www.gzimrewind.com/trailer>.*

#### Description of Gzim Rewind

- “Gzim Rewind” is a documentary film about current events. The main character is Gzim Devishi, who fled the war in Kosovo in 2003 as a child and stayed briefly in a Swedish asylum center. While there, he befriended artist / filmmaker Knutte Wester, who continued to document Gzim’s life after his return to Kosovo.
- Gzim has recurrent flashbacks of war, including a massacre. The flashbacks were visualized as machinima (footage shot inside a video game) by Wester, based on stories by Gzim and his mother.
- Sgt Padrino, a US machinima filmmaker captured machinima scenes in the shooter war game Armed Assault 2, a game produced and owned by the Bohemia Interactive game company in the Czech Republic: <http://www.bistudio.com/>

#### Vision of the Entrepreneur

- The vision is to tell Gzim’s personal story and Wester’s relationship with him, and how Gzim grows up in Kosovo and thinking of himself as a Swedish boy. Thereby he hopes to facilitate understanding of war and refugee experiences.
- Part of artistic intent was to show Gzim’s flashbacks of a massacre, initially captured as machinima, but later been redrawn by hand as animation by Wester. Thereby, the machinima scene does essentially appear in the final Gzim Rewind film.



### **Affordances of the Specific 3D Internet or VW “Spaces” / Platforms Used**

- The 3D graphics of the “virtual space” of the shooter game served well for machinima film production because machinima offers a flexible and inexpensive animation studio that already includes avatar characters (soldiers, backgrounds etc.). The 3D video game look refers to the special graphic look of “first-person shooter” genre of games.
- The machinima animations are fitting for showing the gruesome massacres as flashbacks, with a dreamy, haunted look. This affords sharing emotional reactions.
- The weakness of the use of the Armed Assault II game is that customization is limited, such as adding civilian characters.
- The negotiating the IP (intellectual property) or ownership are problematic. In this case, the BI game company would NOT grant Wester the rights to use the machinima captured in Armed Assault II game for public distribution.

### **Utilization of Social Networks**

- Wester has a network of supporters that he already knew and/or found via social networks, such as the machinima filmmaker who calls himself Sgt Padrino on YouTube.
- Wester does not know Sgt Padrino’s actual name, their collaboration was online via only share drawings etc. and mainly write via together online (never face to face).
- Wester works with an external film editor, Björn Kessler for final editing. The Gzim Rewind musical score consists mainly of contributions by Peter Bryngelsson (nightmares), Fredrik Mjelle (theme).
- The Danish editor consultant, Janus Billeskov Jansen (who is an Oscar winner) consults “con amore”. Wester has met Jansen face to face once. Most of this collaboration is “virtual” (sharing film files, then meeting via skype). The contact with Jansen was established via recommendations from a Danish film consultant that Wester met at a film festival.
- Sgt Padrino uploaded the machinima scenes on his YouTube channel as Gzim Project, such as “Nightmare” <http://www.youtube.com/watch?v=RnGdy05AQoo>, so although the machinima scenes were edited out of the Gzim Rewind film for cinema and television release, the scenes are available online.
- The Gzim Rewind website, YouTube and Facebook Gzim Project site are venues for promotion of the film.

### **Vision for the Future**

- Based on his problems with clearing copyrights, Wester would choose an open source solution if he again considers using 3D animation software, or he will assure the copyrights before reusing a commercial game engine.
- The television and cinema rights are now settled. The film has premiere on Swedish television and cinemas in late 2011. The Swedish Film Institute is assisting in distribution to other countries. Swedish radio interview with Wester, August 15, 2011: <http://sverigesradio.se/sida/artikel.aspx?programid=478&artikel=4643558>

## Healthcare Training Industry

### Case Study 4: The BE Community, US/DK



The BE community website is <http://www.thebecommunity.org/>. The above image is a "little kid" avatar design (by Tiziana Loni) and is available for use by the BE Community members. Loni's avatar design recently won a BE design contest, see all submissions on <http://ourbricks.com/contest/becommunity>.

#### Description of The BE Community

- Mette Terp Høybye is a visiting researcher at the Stanford University School of Medicine, Dept. of Psychiatry and Behavioral Sciences and the founder of the BE Community, which is a virtual environment (or VW) designed for adolescent and young adult cancer patients.
- The purpose of the community is that young patients simply can *be*. It is a space where they can converse with friends on their own terms, and seek support outside traditional clinical settings.
- Terp Høybye teamed up with Henrik Bennetsen, the CEO of Katalabs, which has developed Sirikata, the open-source platform on which the BE community runs.
- The BE community has funding from the Danish Child Cancer Foundation and the Danish Agency for Science and Technology through the end of 2011. Terp Høybye pilot-tested the BE community at the oncology ward, University Hospital Aarhus.

#### Vision of the Entrepreneur

- According to Terp Høybye, the browser-based virtual environment offers social possibilities and can be used for increasing self-efficiency and even adherence to

<p>treatment. It can prevent the social isolation that young cancer patients often face.</p> <ul style="list-style-type: none"> <li>• The vision is to help facilitate communication between the young cancer patients by creating a community.</li> </ul>
<p><b>Affordances of the Specific 3D Internet or VW “Spaces” / Platforms Used</b></p>
<ul style="list-style-type: none"> <li>• The 3D virtual experience adds something unique such as seeing another person as avatar and a perception of sharing a shared “space”. This is engaging and fun for the young users / patients. The patients can be together online, and do not feel stigmatised (such as due to unusual appearance) as they might experience in real life.</li> <li>• The community site provides a certain structure for the support groups. It is also possible to provide visual feedback, such as create animations, that are helpful for showing / sharing emotional reactions.</li> <li>• The weakness of the BE community as a meeting space at the moment is the limited amount of patients using the system. The point with the community is that several people can meet and have meaningful conversations.</li> <li>• Sirikata offers a multi-user, three-dimensional environment in a web browser, which means that users do not need to install or download any additional software to join and engage with others in the community.</li> </ul>
<p><b>Utilization of Social Networks</b></p>
<ul style="list-style-type: none"> <li>• Terp Høybye and Bennetsen met at Stanford University at a time when Katalabs was looking for a collaborative project to try out applications of the technology. This was meaningful for Terp Høybye’s initial ideas about BE Community and their ideas merged.</li> <li>• Terp Høybye’s established contacts in the clinical sector in Denmark are of immense value and opened the way to collaboration with University Hospital Aarhus and Rigshospitalet (University Hospital Copenhagen) and their patients.</li> <li>• The contacts at Stanford University have also been very helpful in establishing the BE community. The success of the BE Community is a result of these contacts, according to Terp Høybye.</li> </ul>
<p><b>Vision for the Future</b></p>

- There is a need to utilize the full potential of virtual environments in many areas (e.g., social interaction) and design based on understanding the wishes of the users.
- By choosing an open source solution like that of Katalabs, it is possible to reduce the costs and increase the accessibility to the users.
- Terp Høybye plans to continue working on improving the usability of the BE Community in 2012 with a team of designers (including designers from LEGO) and medical staff, based on the pilot-testing results.

### Case Study 5: Innovation in Learning (ILL) by Parvati Dev, US/IN

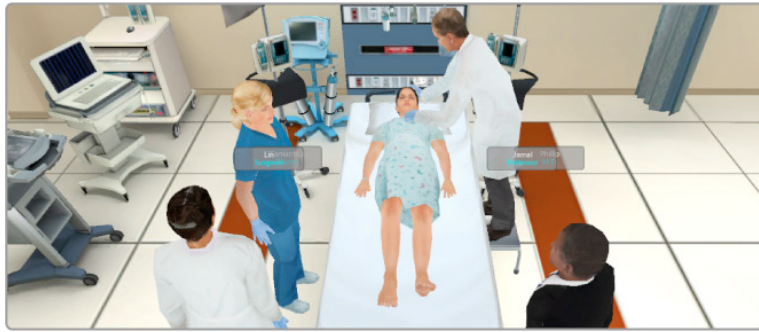


Image showing IIL's CliniSpace, a collaborative virtual medical environment for medical training and conferencing, developed with the Unity authoring tool. Images, videos and description are on: <http://www.clinispace.com>

#### Description of Innovation in Learning (IIL)

- IIL was established in 2008 and is co-founded by Drs. Parvati Dev and William LeRoy Heinrichs, who have been developing the area of medical e-learning at Stanford University.
- Dev is the president and CEO of IIL and has 35 years of experience developing technology solutions applied to life sciences learning.
- The company develops and deploys 3D virtual medical environments with virtual patients for the training of healthcare personnel. They build evidence-based simulations and scenarios for learning in medical virtual worlds.
- The main product is a complete collaborative virtual medical environment called “CliniSpace™” that is designed for medical training and conferencing. The virtual environment is equipped with interactive medical objects (bed, IV stand, oxygen, suction, medications, supplies, EKG, ultrasound, and more). CliniSpace is available through annual subscriptions. There is a customisable virtual patient with a dynamic pathophysiology, a Dynapatient™. Users can affect the outcome of the Dynapatient.
- IIL also provides consulting and training in healthcare applications of simulation-based learning and virtual worlds. Additionally, they build customized three-dimensional virtual environments such as clinics, emergency departments, and city scenes for online, multi-person use.

#### Vision of the Entrepreneur

- Translation of concept learning into actionable knowledge so as to develop well-

<p>trained health care professionals, effective teams, and safe hospitals, clinics, nursing homes and homes.</p> <ul style="list-style-type: none"> <li>• Dev’s vision is based on experiences that people close to her have been exposed to medical errors. The personal awareness of these errors is motivating her to develop ways to improve medical training in the company.</li> </ul>
<p><b>Affordances of the Specific 3D Internet or VW “Spaces” / Platforms Used</b></p>
<ul style="list-style-type: none"> <li>• Dev stresses that what has been taught to their customers in other settings can with the help of 3D Internet be taught to them in a more engaging and immersive manner. She is referring to this as “emotional learning”.</li> <li>• The 3D simulation / training with scenarios offers “emotional learning” - not only the existing intellectual type of “knowledge” is involved, but also people’s feelings are engaged through enactments and interactions. Dev believes that this emotional engagement affords the integration of conceptual (theoretical) knowledge into applied, or action-oriented knowledge, so as to develop well-trained health care professionals, effective teams, and safe hospitals, clinics, nursing homes and homes.</li> </ul>
<p><b>Utilization of Social Networks</b></p>
<ul style="list-style-type: none"> <li>• IIL relies extensively on their partnerships with faculty from Stanford University, the <a href="#">Northern Ontario School of Medicine</a>, Claremont Graduate University, Kyushu University, and Chungbuk National University.</li> <li>• They also have strong ties to companies such as Unity Technologies DK/US and IndusGeeks Solutions: <a href="http://www.indusgeeks.com">http://www.indusgeeks.com</a> in Mumbai, India, who are specialists in the Unity open-source platform, which suits IIL’s “CliniSpace”. IndusGeeks is more than a developer; Dev describes them as “part of IIL”.</li> <li>• U.S. national organizations such as Internet2, and non-profit organizations around the world are a vital part of their social network.</li> </ul>
<p><b>Vision for the Future</b></p>
<ul style="list-style-type: none"> <li>• Dev is interested in improving the interactive capacities of 3D simulation, to function as “dialog engines” and “emotion engines” in medical training.</li> <li>• The challenge is to make the technology more relevant for training.</li> </ul>

## High-tech Industry

### Case Study 6: Katalabs, developers of the Sirikata platform, led by Henrik Bennetsen, US/DK

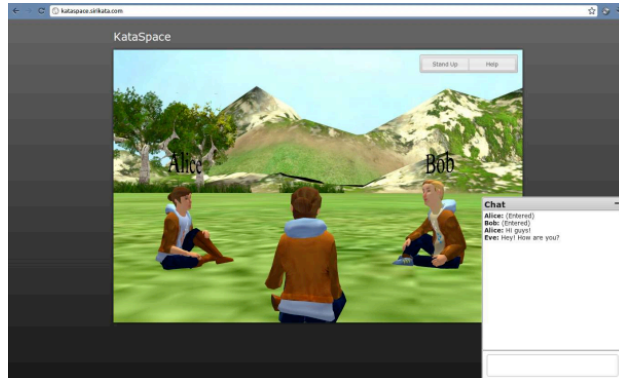


Image of the Sirikata virtual environment from <http://www.katalabs.com/blog/>. Introduction to Sirikata's OurBricks creative 3D content is on <http://ourbricks.com/>.

#### Description of Katalabs

- Henrik Bennetsen, the founder and the CEO of Katalabs, established the company with a group of people in 2010. He had been the associate director at Stanford University Humanities Lab for four years and it was at this time he became aware of VWs
- KataLabs is a commercial company that develops the 3D platform, Sirikata, based on WebGL open source technology<sup>29</sup>. The platform offers a multi-user, three-dimensional environment in a web browser, which means that users do not need to install or download any additional software to engage with others in the community.
- Sirikata is delivered free of charge. KataLabs makes money through charging for tailoring the platform to customers with specific needs.

#### Vision of the Entrepreneur

- The vision is to make 3D part of the web by building software engines that allow

<sup>29</sup> Henrik Bennetsen from Katalabs presents his vision regarding the development of "OurBricks" at WebGL Camp 3 (June, 2011): <http://www.youtube.com/watch?v=acP4WWndBJ0>. See WebGL examples: <http://www.ibiblio.org/e-notes/webgl/webgl.htm>.



<p>people to use the tools.</p> <ul style="list-style-type: none"> <li>• The ultimate goal is to democratise the tools around 3D by offering flexible building blocks that are required for wide adoption.</li> </ul>
<p><b>Affordances of the Specific 3D Internet or VW “Spaces” / Platforms Used</b></p>
<ul style="list-style-type: none"> <li>• The Sirikata software is aligned with web technologies such as Web GL. This gives KataLabs the opportunity to ask Google for help, such as by providing bug reports when they run into a problem. Since it is based on Web GL, Google will fix the bug for them. If they had developed the plug-in themselves, they would have been forced to fix it themselves.</li> <li>• Affordances of Sirikata include ease of use for building 3D based on modularity of their “OurBricks” system, a way to create 3D models which can be easily combined and shared.</li> <li>• The platform offers good graphic resolution. It allows for rapid visualisation and real time collaboration.</li> </ul>
<p><b>Utilization of Social Networks</b></p>
<ul style="list-style-type: none"> <li>• The group of people who established KataLabs consisted of four entrepreneurs who represent a network with strong ties to IT companies in the Silicon Valley. Two of the founders came from Stanford University, another had just sold his company to Google, and the fourth is a system architect with a PhD in computer science.</li> <li>• Bennetsen describes KataLabs as a very small company but with very big friends, such as Google.</li> <li>• They rely on collaboration with experts in 3D Internet, mainly in Silicon Valley, and prototyping in current projects with cultural and social institutions, and input from researchers such as Terp-Høybye.</li> </ul>
<p><b>Vision for the Future</b></p>
<ul style="list-style-type: none"> <li>• The short-term goal is to create more stability around KataLabs and be able to develop the business plan further.</li> <li>• They are hoping to bring the web forward to a new level that allows seamless browsing across 2D / 3D, and 3D visualizations.</li> </ul>

## Case Study 7: Train for Success by The Gronstedt Group US/SE



*Still image from video of "3-D Immersive Emergency Shelter Simulation" developed for the City of New York by the CUNY School of Professional Studies with the Gronstedt Group, available on [http://www.gronstedtgroup.com/site\\_2011/index.html](http://www.gronstedtgroup.com/site_2011/index.html).*

### Description of Train for Success by the Gronstedt Group

- Train for Success is the Gronstedt Group's weekly events in Second Life where they bring together training and communication professionals from all over the world to explore how leading corporations are transforming workplace performance with virtual worlds.
- Anders Gronstedt is the founder and the CEO of the company. After finishing his PhD in marketing in 1994 and worked a few years in academia, he established the company in 1997 focusing on marketing consultancy.
- Their focus is on training in the field of marketing by using the latest technologies to reach out. They followed the trends of e-learning, added simulations, video, and podcasts. When their clients started inquiring about Second Life, they became heavily involved in performing training in 3D environments.

### Vision of the Entrepreneur

- With no outside investors, the Gronstedt Group does not have external pressure to deliver a high level of profit. Instead, they focus on covering their expenses and making enough profit to make it worthwhile. In short, they want to stay on the cutting edge by being innovative and to be able to deliver new and innovative training solutions.
- The plan is to develop and seek recognition for what they are doing and hoping that

<p>this will pay well. They have a business model based on slow growth in a niche market.</p>
<p><b>Affordances of the Specific 3D Internet or VW “Spaces” / Platforms Used</b></p>
<ul style="list-style-type: none"> <li>• The 3D virtual environment offers something more than the basic e-learning could provide. It is possible for groups to do self-based simulations. It has also taken them beyond the usual “speaker circuits” and given them a lot of publicity.</li> <li>• The visibility they get through the VW work influences the other consulting work they do. They find that the VW participants report that their experience are positive - they enjoy the sense of immersion VWs offer, and the training is perceived as “cool”. However, the VW area has not (as of yet) become a driver for their business.</li> <li>• The Gronstedt Group has seen a growth in the demands for doing meetings, collaboration and live role-play via 3D applications the last few years. The company is in a transition phase where they are aiming at making their services available via a browser-based platform.</li> </ul>
<p><b>Utilization of Social Networks</b></p>
<ul style="list-style-type: none"> <li>• The Gronstedt Group employs six people full-time and has attracted a wide network of people who work between half time and full-time on projects. This extended group of participants are treated as employees and consist of 15 - 20 people.</li> <li>• When doing a project they rely on collaboration with experts and contractors who are not part of their own team, such as Avaya, which has a Web Alive Platform <a href="http://avayalive.com/WaStore/">http://avayalive.com/WaStore/</a>. ReactionGrid <a href="http://reactiongrid.com/">http://reactiongrid.com/</a> is an important partner in Gronstedt Group’s transition toward using a browser-based platform, since ReactionGrid develops open-source solutions.</li> <li>• The Gronstedt Group relies on a broad network of people from academia, from other consulting companies, and other professions to develop services in demand by clients. This provides the flexibility Gronstedt Group needs to perform their tasks and to call in experts as clients and technologies change.</li> </ul>
<p><b>Vision for the Future</b></p>
<ul style="list-style-type: none"> <li>• The Gronstedt Group has appreciated the facilitation of VW development in the U.S. because the federal government supports the development of 3D environments (such as for virtual world conferences, simulation / training of staff, war gaming, etc.).</li> <li>• The open source solutions are considered highly interesting for the future.</li> </ul>

## 4. Results

Our results can be said to be preliminary in the sense that so much more can be done with our rich data, and we continue to collect data and see patterns between cases. As noted above, our two original questions refer mainly to *affordances* and *social networks*: 1) *What does the 3D immersive Internet offer or afford as a “space” for entrepreneurial practices?* 2) *How do entrepreneurs utilize their social networks to learn to deploy the 3D Internet?* However, during the process of interviewing entrepreneurs for our case studies, it became evident that virtual collaboration in complex project teams was an important factor in their entrepreneurial activities. Thus, our analysis below is structured around three main aspects: our two original questions relating to 1) the affordances of VWs / the 3D Internet and 2) the importance of social networks, as well as the emergent aspect, 3) virtual collaboration in complex project teams.<sup>30</sup>

### *1) Affordances of VWs / the 3D Internet*

The affordances highlighted in our case studies<sup>31</sup> of VW entrepreneurs vary, but there appears to be a clear interest in VWs with regard to the following qualities: flexibility, simulation and visualization. Each of these qualities is mentioned below with comments about the dichotomy and challenge in regards to each quality, such as flexibility/inflexibility.

*A) Flexibility of use, which pertains to the open access and development of VWs by entrepreneurs.* The flexibility of use is important for the VW entrepreneurs especially in terms of how to develop their ideas, services and products. The flexibility in terms of copyright and re-use is important for entrepreneurs because they have concerns about investing money and time to create assets (such as designing a virtual film studio) in a VW platform is owned and controlled by another company. However, open-source VWs stand out as an important development because it allows for a high degree of flexibility due to open use licenses, access to underlying code, and the possibility to adapt code to one's own needs. Open-source VWs are accompanied by a knowledge base and often a high level of support in the respective open-source communities, such as OpenSim. The flexibility of open-source is

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<sup>30</sup> It is important to note that more analytic work will be done as we proceed with WP 4 and 5 and upcoming papers in 2012.

<sup>31</sup> The benefits and challenges of VWs, their affordances and potentials are discussed widely, such as in the computer-supported collaborative work (CSCW) literature, see for instance: [www.interaction-design.org](http://www.interaction-design.org) As this report is not academic, we have chosen to stay close to practice and not debate theory at length. (See more on definition of terms and information on theory and publications in Appendix II, III, IV.)

apparent in the case of WebGL used by Katalabs in the BE Community project, IIL's use of the Unity engine, and the Gronsted Group's transition toward open-source.

A business model based on open-source is exemplified in the Katalabs case: Sirikata is an open-source core technology, a modular software that is easy to use for prototyping and building in 3D. It is free but can be customized for specific uses, and the company charges for this service. However, while open source VWs offer the freedom to create and adapt the VW to one's own needs, business models based on open source technology may not be compatible with the traditional economic organization and business models within the entrepreneur's industry. This may lead to challenges for the entrepreneur in terms of his/her ability to gain acceptance for his/her new product and/or service.

On the other hand, *inflexibility* appears for instance, when the entrepreneurs lack control over the contents created. In other words, if the owner of a VW platform decides to close the VW, or to deny access in some way to the entrepreneur, then the entrepreneur may be left empty-handed, unable to recapture any value from his/her resources and time invested in the new venture in the now inaccessible VW. For example, the Gzim Rewind case involved problems with the Bohemia Interactive game company, that would not clear the rights to distribute the machinima in the film Gzim Rewind. In the case of *My Avatar and Me*, the use of Second Life footage was considered public domain and rights were cleared only with the specific contributors of avatar designs, graphic backgrounds, etc. However, the graphics are assets that remain in SL and are difficult to re-use, i.e., they are not under the full control of the filmmakers.

*B) Simulation - which pertains to the qualities of immersion and real-time meeting "spaces" harnessed by entrepreneurs.* The affordance of simulation can be used for the purposes of training where users simulate or perform in role-plays, which can be captured and replayed, such as used by the Gronstedt Group and IIL. Simulation can be seen as a teaching and training method supported by VWs that allow users to try out new ways of training activities and evaluating under low-stress conditions. It offers a playful way to learn about serious situations, such as health care, emergency care, etc.

Furthermore, VWs offer entrepreneurs and their customers and other stakeholders distributed across geographic locations the ability to meet in simulated virtual environments that are synchronous (real-time), where users can join activities, share common experiences (such as young cancer patients meeting in BE Community) and learn with one another. It is a cost-effective way of meeting such as in VW role-plays. It is important to note, however, that we found that this kind of training is usually combined with face to face, such as in the case of

III. This kind of simulation can facilitate what the entrepreneur Dev calls "emotional" learning and can lead to further reflection among users. Classic learning theory supports the idea of learning by doing (Dewey, 1925) and the importance of embodiment in learning processes.

A *lack of the sense of immersion* and presence can be attributable to, for instance, poor usability design, instable technologies that frustrate the user and disrupt the sense of engagement in an activity in a VW. A particular design problem to consider is spookiness and revulsion toward beings that resemble humans too much, which is known from robotics and termed the "*uncanny valley*"<sup>32</sup>. There is an increasing focus on the pedagogical and psychological issues and applications of immersion in VWs<sup>33</sup>, which are informing the design of VWs and thereby the opportunities for entrepreneurship in the future.

C) *Visualization and modeling, which refers to VWs affording interactive visuals that apply to uses in the game and film industry and generating visual models for uses in learning and communication.* For instance, real-time animation (machinima) appears in the feature films *My Avatar and Me* and in *Gzim Rewind* although Wester had to rework the machinima into hand-drawn animation. Wester retains the 'realistic or 3D filmish look' of the 3D graphic war video game for the representation of Gzim's nightmare in the final film *Gzim Rewind*. The machinima thereby serves as a storyboarding or visualization. In the case of Bente Milton and Mikkel Stolt's *My Avatar and Me*, they bring machinima filmmaking and Second Life communities into the film story line and show the Second Life story environment and the "reality" of Copenhagen as parallel and interconnected. The blending of events in games in the *Granny Dancing on the Table* cross-media project with the augmented reality game will allow for experimentation with the integration of game play, interaction in the 3D simulated game environment, and the film. The affordance of *visualization* in VWs thus allows entrepreneurs to create and interweave multiple story environments and story lines across media platforms and at a much lower cost than traditional animation.

3D modeling or visualizing of complex processes has existed for decades, but it is just now becoming more accessible and able to run on a laptop computer with VWs. A problem is the requirement of strong computer processing and different 3D systems for stereoscopic vision

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<sup>32</sup> [http://en.wikipedia.org/wiki/Uncanny\\_valley](http://en.wikipedia.org/wiki/Uncanny_valley)

<sup>33</sup> For instance, research by Marianne Riis, PhD student (2008-2011), Aalborg University, Copenhagen, Denmark on the educational uses of VWs: <http://milmariis.wordpress.com/>; and at the *PREVIEW-Psych* (Problem-based Learning in Virtual Interactive Educational Worlds for Psychology) with University of Derby, Aston University, Coventry University and the [Higher Education Academy-Psychology Network](http://previewpsych.org), UK: <http://previewpsych.org>.

(such as wearing glasses). Many of the possible uses of 3D are still under development, but the entertainment industry (with 3D cinema and TV) is at the forefront. The modeling of complex processes for health care is exemplified with IIL, which includes the Dynapatient and some affordance of looking "inside a model" the body. It allows medical staff to simulate and get systemic overviews of complex systems, but it is of-course limited to the amount of relevant data that is embedded into the system.

## ***2) The Importance of Social Networks***

We found that social networks were extremely important for the acquisition of knowledge and other resources, such as human capital, reputation, access to networks, and customers, necessary for value creation by the entrepreneurs. For example, the entrepreneurs in our cases used social networks to gain knowledge about funding strategies, technical and open source know-how, legal advice on IP, and cooperation with business partners about the distribution of their goods and services. Moreover, we found that many of these entrepreneurs used their local face to face networks for access to certain resources and support, but *integrated these to a high degree with* their collaborations in virtual networks for other resources. They often built their local networks on existing strong ties but then also developed new networks originating in the virtual, such as the *My Avatar and Me* film directors actually meeting a photographer / filmmaker who became an important collaborator in Second Life.

Thus, we find that the VW technologies enable entrepreneurs located in the Nordic region to develop their virtual social networks such that they may access resources in other regions of the world. They may therefore supplement their prior social networks with virtual networks, yet it is unclear if people in the Nordic region have different networks than those in other areas such as Silicon Valley since we did not do such a comparison. However, it became quite apparent that many of the more successful entrepreneurs become global and that Silicon Valley is a hub for networking, as is apparent in the case of Katalabs, the BE Community, and Unity Technologies.

There is a pattern of reliance on networks of other entrepreneurs, "con amore" assistants, i.e., people working with zeal and for free (evident in all three film and multimedia cases), and interested private sponsors or "followers" who serve as co-developers of ideas. This offers a competitive edge and growth for these entrepreneurs. The high degree of sharing and co-creation suggest that networks are very important for entrepreneurship that involves emerging technologies and experimentation.

### ***3) Virtual Collaboration in Complex Project Teams***

In our case studies, we found that all entrepreneurs collaborate to a very high degree in virtual settings. The collaborative, interdisciplinary entrepreneurial teams described by the interviewees create a picture of many groups of people working together in a loose network with some strong ties although some collaborators never actually meet in person (offline). This collaborative work is typified by rapidly shifting roles and tasks as in a “spaghetti” organization coined by Kolind (2006), and this virtual collaboration is reflective of the overarching sweeping changes in work and a reorganization of work in the last several decades. For example, in the introduction to the special issue on “Communication Processes for Virtual Organizations”<sup>34</sup> DeSantis and Monge note the huge attention in the management literature given to virtual organizations and the possibilities of *virtual* meetings, work teams, offices, factories, companies, and networks.

We found that the collaborative parties often came from different organizations dispersed across the globe to meet in these projects and that a shared understanding, coordination, and adaptation were important for these international project teams to be successful, similar to the findings by Qureshi et al. (2006). For as the entrepreneurs involved themselves in their projects, they exchanged ideas and information, and build upon each other’s ideas. We also found support for our preliminary analysis in the findings in Litsikakis’ Virtual Project Management (*VPModel* reproduced below)<sup>35</sup> in the article “Best practice for Project Management in the Virtual World [Internet]” (2009). Litsikakis discusses the importance of obtaining trust and sustaining communication and involvement of the geographically distributed project members.

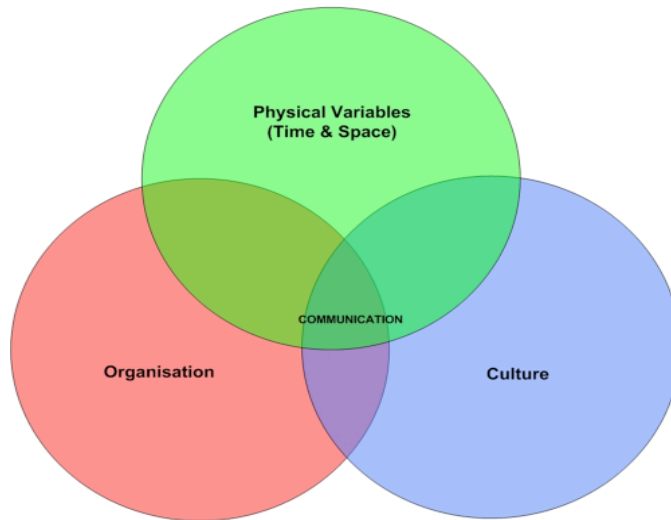
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<sup>34</sup> *Organization Science* Nov/Dec 1999, 10(6)693-703. DOI: 10.1287/orsc.10.6.693

<sup>35</sup> From <http://knol.google.com/k/dimitrios-litsikakis/virtual-project-management-vpmodel/3ib8exvrc87n4/9>.



**The VPModel**  
Linking the main issues in  
Virtual Project Management



*The VPModel proposed by Litsikakis*

The VPModel relates to physical variables such as the space and time, including geographic distance, time zones; cultural differences such as language and work culture differences; and a need for the organization of work such as in a VW or "virtual office" with common repositories.

It appears that communication is crucial for managing a dispersed organization with *virtual* collaboration in order to avoid misunderstandings, as these may become exacerbated by not meeting face to face in both formal and informal settings. The questions about how entrepreneurs deal with communication in their team arose in our analysis, such as in the team involved in *Granny's Dancing on the Table*. Sköld explained that the team meets periodically face to face for intensive brainstorming, coordination and planning as this makes their periods of distributed work more efficient. We need to explore more about how VW environments facilitate and/or may *hinder* the building of trust and process of idea development in virtual collaboration. A central question appears to be how a virtual team sustains an open, dynamic communication and involvement of all the members in a geographically distributed and multi-disciplinary team. The perspective of the affordances of VW for teamwork and the specifics of how VWs can facilitate or hinder communication (visual, audial, gestural) and how trust develops would be interesting to explore more.

## 5. Implications and Discussion

Below we provide our answers to a series of question that have arisen during the course of our study.

### **What are the challenges of VWs in a nutshell and how do the entrepreneurs overcome the challenges?**

While there are considerable potentials for VWs for entrepreneurs (as reviewed in section 2 of this report), we should also consider the limitations and challenges that entrepreneurs face in relation to the emerging 3D Internet. These include legal issues with copyright, a steep learning curve for deploying new technologies, lack of common design elements, difficulties of cross-cultural communication (offline as well as online), and instability of new technologies.

Although commercial VW technologies are advancing rapidly, this growth is accompanied by difficult proprietary issues concerning copyright and IP. Therefore, efforts to use open-source VW software are growing considerably. The questions of IP and open-source in our age of social media and media convergence present challenges for creating business models for short and long-term value creation for entrepreneurs. For instance, Hanna Sköld talks a great deal about how she is becoming a fundraiser, rather than a filmmaker, and has to fit her *Granny's Dancing on the Table* cross-media project into traditional media categories despite there being some Nordic sources for cross-media. In order to overcome these challenges, entrepreneurs such as Sköld develop substantial involvement in local, national and international networks, and are exploring new solutions such as using Creative Commons.<sup>36</sup>

### **How does the current “flat” web with its various VWs differ from the vision of 3D third generation web?**

The third generation or 3D Internet as Bennetsen proposes it, offers more fluid, seamless connectivity and a wider range of interactions. The entrepreneurs in our cases are harnessing the current social networked media or Web 2.0 well, exploiting opportunities for open source development, co-production, co-creation with users in social networks, such as collaboration

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<sup>36</sup> Sköld used a Creative Commons license on Pirate Bay for film distribution of an earlier film, *Nasty Old People* (2009), thereby received donations which covered the film production costs. <http://nastyoldpeople.blogspot.com/>.

with avatar performers for *My Avatar and Me*. However, the vision of the third generation can extend and supplement this with a wider range of communicative affordances (such as “performing” role-plays in real-time immersive simulation environments). A greater connectivity between the flat and the 3D web will allow for more cohesion and integration of services, such as creating in multiple cross-media platforms for storytelling (as in the vision of the *Granny’s Dancing on the Table* project). The key seems to be finding a business vision or niche that adds value to the current virtual services or products and the future 3D web.

### **Why are networks important for VW entrepreneurship?**

Our preliminary results indicate that 3D Internet entrepreneurs are “pioneers” who are designing the affordances and utility of the future Internet. They are characterized by active knowledge sharing in entrepreneurial networks, and organization of complex collaborations. This enables greater risk-taking and higher performance. Cultural relatedness appears significant for the Nordic countries, and networking efforts bring together an already inter-related niche. Getting funding from European and Nordic sources is challenging but is beneficial in that it supports integration and prevents fragmentation among Nordic actors.

### **What are recommendations for VW entrepreneurship in the Nordic region?**

In our opinion, entrepreneurship requires excellent support networks and knowledge, such as about the affordances offered by VW technology and the resulting global markets. This knowledge is available in the Nordic region, yet Silicon Valley remains attractive as a hub for entrepreneurs in the area of 3D Internet development. The rise of new media is effecting transformations across the globe, and there is therefore a need to support and encourage Nordic entrepreneurs to think and act more globally<sup>37</sup>.

The seven case studies demonstrate that the Nordic entrepreneurs are a part of the increasing “globalization” of creative industries, which is very challenging proposition – their networks are therefore extremely valuable. We suggest that academics can play a role in developing and stabilizing such entrepreneurial networks (see upcoming WP 4 and 5 reports for the specific recommendations).

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<sup>37</sup> Presentation given at the Babson College Entrepreneurship Research Conference (BCERC) June, 2011, is available on <http://prezi.com/oyi9mqgm6ium/>

**What are some examples of a viable open source business plan?**

A main issue for companies using open source is having a viable business model that also allows for adaptability and development, loyalty, and reliability of their solutions. An open-source platform is often both “given away” as a basic package or offered with additional functionality and support at a low cost, such as Unity Technologies. Katalabs will offer their open source technology, i.e., some core technology, for free. They also offer various services around this core technology tailored to the unique needs of a customer for a price. The development and customization that is done, for instance with the BE Community, helps the Katalabs team learn about and improve user experience, engagement and relevance for that target group.

**What are possible "lessons learned" that would be of interest to entrepreneurs who might like to explore the use of these VW technologies?**

Lessons include the relative advantage of open source solutions that can be developed with academics as the history of open-source indicates a strong tie to incubation and development with academic partners. There is an increasing trend toward utilizing open source software and collaboration between inter-disciplinary teams. The participation in networks appears to be a great assistance with problematic experiences, such as with getting contributors who work for free, for help with consideration of alternative business models, IP, technical know-how.

**What is your advice for policy on how to facilitate entrepreneurship in this area?**

We suggest that policymakers consider reducing the complexity of establishing funding. One specific area is the support of trans-disciplinary/ cross-industry projects, such as cross-media or multimedia production schemes. It is striking that so few funding schemes allow for cross-fertilization of funding between film, TV and game production, with exceptions such as New Danish Screen and fiction / documentary film<sup>38</sup>.

We also suggest that more hands-on training in entrepreneurship be offered across the fine arts and “creative industries”, such as at art and film schools. The purpose is to assist students to conceptualize business ideas and manage economic models that relate to the creative production (across the arts and IT). More cross-fertilization between the arts disciplines and the “hard” technologies are needed to encourage “thinking out of the box”. Policymakers

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<sup>38</sup> New Danish Screen supports the development and production of cross-media film projects, including documentary, fiction: [http://www.dfi.dk/branche\\_og\\_stoette/new-danish-screen.aspx](http://www.dfi.dk/branche_og_stoette/new-danish-screen.aspx).

could consider perspectives other than business schools and high technology, and into other arenas, such as in the DADIU collaboration<sup>39</sup>. This cross-fertilization is also part of educational programs such as HUMTEK (Humanities-Technologies studies) at Roskilde University.

### **What are your ideas for further work?**

The future directions in this research include writing up of the current cases (see appendix II.)

We have several ideas for follow up on the seven cases: additional interviews to understand the development of their companies (and success / failures) over a longer time period., and investigation into the entrepreneurs' social network with social network analysis.

Further interviews could include Unity Technologies (DK/US). Unity was not selected in this round because it is no longer a small entrepreneurial company. It does figure indirectly now through IIL. It would be interesting to add Unity Technologies to showcase a company that is has risen so quickly from its upstart in 2003, and has had such a large impact on the Nordic and global VW and game industry.

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<sup>39</sup> DADIU (The National Academy of Digital, Interactive Entertainment) trains students in making computer games through an inter-disciplinary collaboration between universities and arts-oriented educational programs in Denmark. DADIU runs annual workshops and competitions, resulting in game prototypes <http://dadiu.dk/>.

# Appendix

## Appendix I.

### Interview Guide for 3d Internet Entrepreneurial Next Practices (2011)

*Guide for case studies used by Frølund, Flåten, and Trondsen in the NVWN research project*

#### Background information of interviewee

Name:

Gender:

Education:

Work experience:

Position/role in the entrepreneurial company/project:

Physical location

#### Description of the 3D Internet entrepreneurial company/project

1. What is the timeline and/or history of your company/project?
2. Who started it - and how did it all start?
3. What is the size – how many employees, community members?
4. Do you have funding or revenue?
5. Tell us about your main product or service
6. Tell us how you organize and manage the company/project
7. Are you profit or non-profit?

#### Vision

8. What is the vision or interest driving the company/project?
9. What developed this interest?
10. Can you name some sources of inspiration, such as a person or group, or film/game/virtual world/program or other?
11. Do you have a business plan and strategy for development– and what is it?

#### The 3D Internet/VW platform use

12. Which media platform(s) are you using currently – and why?
13. What have you tried out in the past?

14. What did you need to know to start?
15. How are you deploying the platform(s) in your product or service?
16. What does using it in general allow you to do, which you could otherwise not do?
17. How is the making/creating/doing different with 3D Internet?
18. How is it helping you (such as, in promoting your product or extending your services)?
19. What does it NOT allow you to do?
20. Are you facing any problems currently with the platform you are using?

### **Collaborations / co-creation**

21. Who do you work with, and how do you work with them?
22. How do you find/know your possible collaborators?
23. How do you stay in touch?
24. Who do you turn to for help/inspiration?
25. How do you help each other?
26. Are you active in formal/informal networks related to virtual technologies or other areas?
27. What is most important for you regarding collaboration?
28. What makes the collaboration successful or not successful?

### **Visions for the future**

29. What particular ideas/dreams do you want to develop further?
30. Tell about how you view the *opportunities* you are pursuing and do you see or create these opportunities - as an entrepreneur?
31. If you were to predict a future for new technological “tools”, what would these sort of tools be, and what would they help you to achieve, that you cannot do right now?
32. Are there any sorts of problems that you foresee in the future? If so, tell us more about problems: for your product or service and in regards to your use of 3D platforms.
33. Are there any programs or technical solutions that you are missing?
34. Please add any suggestions that you would like to pass on to researchers in NVWN or policymakers?

## Appendix II.

### Current and upcoming publications and plans for dissemination

#### Publications

The authors of this report have been writing up the cases for dissemination in various venues.

The following are accepted and in process or already completed:

- Frølund, L. 2012a. (in press) Animated war: Perspectives on resemiosis and authorship applied to two DIY film projects. *Convergence*. 18 (1) February
- Frølund, L. 2012b. (in press) Facing the Audience: Dialogic Theory and the Hybrid Animated Film. In *Understanding Machinima: Essays on Film Production in Virtual Worlds*. Jenna Ng (ed.). London and New York: Continuum International Publishing Group Ltd
- Frølund, L. 2012c. (in press) Co-production and Virtual Ethnography: Methodological reflections about dialogic communication on and through online narratives. In *Metaverse Methodologies: Approaches to the Study of Phenomena in Flux*. (Louise Phillips and Ursula Plesner, Eds) Routledge
- Frølund, L. 2012d. (in press). "Machinima Filmmaking as Culture in Practice: Dialogical Processes of Remix", Johannes Fromme and Alexander Unger (eds), *Computer Games and New Media Cultures: A Handbook of Digital Games Studies*. New York and Heidelberg: Springer Science and Business Media
- Frølund, L. 2012e. (in press) "Roles, voices and disputes: Reflections on the dialogical understanding of knowledge in regards to an online contest". In *Knowledge and Power in Collaborative Research: A Reflexive Approach*. Louise Phillips et al (eds) Routledge
- Flåten, B.T. & Hansen, J. Ø. 2012 (in press) Language Instruction in a Virtual World: A Business Case Study, Gregory et al. (eds), *Virtual Worlds in Online and Distance Education*. Canada: Athabasca University Press
- Frølund, L. & Flåten, B.T. 2011a. *Leveraging The Affordances Of The Emerging 3d Internet For Entrepreneurial "Next Practices": Selected Case Studies From The Nordic Creative Industries*. BCERC. Syracuse. June 10. Conference proceedings.
- Frølund, L. & Flåten, B.T., 2011b. *Selection of best entrepreneurship practices in relation to the emerging 3D Internet*. Nordic Virtual Worlds Network Project (NVWN, Project number 09045, Milestone 06) Available 2012 on <http://www.nordicinnovation.org/>

#### Possible journals for submission of upcoming articles:

- *New Media & Society* <http://nms.sagepub.com/>
- *Convergence: The International Journal of Research into New Media Technologies*, <http://con.sagepub.com>
- Mediekultur Journal. Current call for issue in 2012: *Media at work – new practices* <http://ojs.statsbiblioteket.dk/index.php/mediekultur/announcement>
- Participatory Design Conference 2012 <http://pdc2012.org/>



## **Integration, Synthesis across Work Packages 3, 4, and 5 and Upcoming**

### **Deliverables**

The three sectors (film and multimedia industry, health care industry, and high-tech industry) are distributed across the different work packages as follows. There has been extensive coordination of selection of relevant entrepreneurs, interviews, data analysis, and write-up between Lisbeth Frolunde, Bjørn-Tore Flåten with Robin Teigland and Eilif Trondsen. We are proceeding with analysis across the case studies.

Our ongoing analysis will feed into the synthesis of findings, and later deliverables for the final report. We also plan on further dissemination of our results in academic publications in 2012. Frolunde (with assistance from Experience Lab at Roskilde University) arranged the event at the Cross-media Storytelling seminar held on the 1<sup>st</sup> of December, 2011. The *My Avatar and Me* co-directors, photographer and avatar performer participated. This event will be presented in the WP 4 “Final scientific/expert report” (31.12.2011). Similarly, a workshop on Entrepreneurship in Virtual Worlds was held as a mixed-reality event in Kristiansand, Norway on the 8<sup>th</sup> of November.

### **Plans for disseminating results internationally**

Lisbeth Frølunde will continue analysis and disseminate results of case studies in Denmark in seminar with practitioners. A video on the Cross-media Storytelling seminar will be available online in 2010 showing highlights from the event, including Frolunde’s presentation on coss-media, interviews with the film’s co-directors, and panel discussion simulcast (with avatars in Second Life).

## **Appendix III.**

### **WP 3 and WP 4: Differences**

The tasks outlined in contract for WP3 have a focus on case studies. This overlaps with and relates to upcoming synthesis and recommendations especially in WP 4 and 5 (see specifications below from the NVWN contract).

#### **A1.3 WP3: Best Practices in VW Entrepreneurship (Roskilde, Agder)**

##### **Nordic VW Project kick-off meeting at SSE (M02)(15.03.2010)**

*Objective: To develop understanding of state-of-art entrepreneurship activities in VWs*

- To investigate best practices in entrepreneurship in VW business and other fields, eg higher education, NGOs, through a) literature reviews and 2) case studies of entrepreneurs physically located in Nordic region and entrepreneurs in various VWs

D3.1 Literature review of the relevant literature related to entrepreneurship in virtual worlds (01.07.2010)

D3.2 Plan for scientific review article of the relevant literature related to entrepreneurship in virtual worlds

D3.3 List of good entrepreneurship practices in VW business and other fields, eg higher education, NGOs, of organizations physically located in Nordic region and of innovating organizations in various VWs

D3.4 Case study template for best VW entrepreneurship practice case studies

##### **D3.5 Selection of best entrepreneurship practice case studies in VW business and other fields, eg higher education, NGOs, of organizations physically located in Nordic region and of innovating organizations in various VWs (M06)(01.09.2010)**

D3.8 Case studies of best practices in VW entrepreneurship (01.06.2011)

D3.9 Plan for scientific article on best practices in VW entrepreneurship

D3.10 Seminar in Second Life on best practice case studies in VW entrepreneurship

##### **D3.11 Final Scientific/Expert report on best practices in VW entrepreneurship (M11)(01.09.2011)**

D3.12 Submission of material for final scientific/expert report (31.12.2011)

#### **A1.4 WP4:**

##### **The Future of Entrepreneurship and Innovation in VWs (SSE, Roskilde)**

*Objective: To ensure the best leverage of VWs for Nordic entrepreneurs and organizations*

- To synthesize findings on best practices in innovation (WP2) and entrepreneurship (WP3) and provide recommendations to Nordic entrepreneurs and organizations interested in innovation on how to best leverage VWs

D4.1 Identification of processes and industries that can best leverage VWs and VW technology

D4.2 Investigation of creativity in VWs

D4.3 Analysis and synthesis of key trends and best practices in VW innovation and VW entrepreneurship (01.12.2011)

D4.4 Internal report on potential future best practices in VW innovation and entrepreneurship

D4.5 Seminar in Second Life on synthesis of potential future best practices

D4.6 Submission of material for final scientific/expert report (31.12.2011)

##### **D4.7 Final Scientific/Expert report on potential future best practices in VW innovation and entrepreneurship (M16)(01.02.2012)**

## **Appendix IV.**

### **Definitions**

Below is a review of terms that follow on the text of the earlier report (M06) submitted in 2010, Best Practices / Next Practices and offers further discussion of our key terms

#### *Next practices*

We are inspired by Prahalad & Ramaswamy, 2003 and 2004<sup>40</sup> which include discussions on the value of exploring next practices in business by doing research that aims to pick up the early, weak signals of a fundamentally changing paradigms and attempting to amplify them into a clearer picture. In our opinion, “next” is more fitting than “best” practices for looking at the potentials in “next” changes that are just emerging in the present and projecting them into the future.

#### *3D Web or 3D Internet*

We prefer to use the term 3D Internet rather than virtual worlds although definitions overlap. We attempt herein to look toward the integration of 2D Internet (meaning the current flat-looking graphic representational space). The Web 2.0 or social web of today, where Facebook exemplifies user-driven content has connections with more experimental, emergent applications that allow for 3D to some degree or another. This 3D web terminology is inspired by discussions with Henrik Bennetsen<sup>41</sup> at Sirikata and Eilif Trondsen at SRI in Silicon Valley. Other experts also view “virtual worlds” as more or less on a spectrum of Internet-based “spaces” where users interact, generate a visual representations of themselves (whether a 2D photo or a 3D avatar, which they can combine and integrate), engage in learning activities (Pfeil, Ang, & Zaphiris, 2009), and wherein users can “move”, and cocreate contents to some extent – but there is a call for standards for 3D web (Sivan, 2010).

In line with Bennetsen, Sivan and Trondsen, we propose to define and discuss a 3D Internet which co-exists with the 2D, rather than using the notion of “virtual worlds”. This 3D Internet

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<sup>40</sup> C. K. Prahalad and V. Ramaswamy (2003) The New Frontier of Experience Innovation. MIT Sloan Management Review. 44(4); C. K. Prahalad and V. Ramaswamy (2004) Co-creation experiences: The next practice in value creation. Journal of Interactive Marketing. 18(3): <http://onlinelibrary.wiley.com/doi/10.1002/dir.20015/abstract>

<sup>41</sup> See Bennetsen’s presentation of his ideas regarding a 3rd Generation open source 3D Web on [http://fora.tv/2011/08/31/Henrik\\_Bennetsen\\_Towards\\_a\\_3rd\\_Generation\\_Web#The\\_Digital\\_Remix\\_A\\_New\\_Paradigm\\_for\\_Creation](http://fora.tv/2011/08/31/Henrik_Bennetsen_Towards_a_3rd_Generation_Web#The_Digital_Remix_A_New_Paradigm_for_Creation)

can be simply defined as similar to definition of VW by Mark W. Bell, that is, interactive communication systems where users (the human participants) are interactive agents (often represented as avatars), who share a three dimensional digital space. In this space, users can interact, such as through avatars' gestures, and can use voice, navigate, and often build or manipulate objects.

We propose seeing a situation where the 2D & 3D Internet as increasingly fluid and with reference to each other. They co-exist as networks that are part of the "real world" of everyday, physical, cultural and social life and offer a multitude of ways to communicate. The situation of the 3D Internet is viewed as part of media convergence (Jenkins, 2006; Lowood, 2006; de Freitas & Griffiths, 2008) or a "blurring" of the lines between media types and platforms, where online games technologies and practices are becoming more pervasive and commonplace as social practice.

### ***Entrepreneurship in Relation to the Future of VWs***

In line with the definitions of entrepreneurship in this report and literature review, *entrepreneurship in relation to VWs / 3D Internet* can be interpreted in regards to having the following characteristics to some degree:

- Developing ***new markets where virtual products/services are offered*** in a virtual small business by entrepreneurs.
  - As the public emergence of the Internet created a demand for web developers and web designers, virtual worlds are creating demand for scripting developers and product designers. This opens up for amateurs and pros, who may become entrepreneurs.
  - Creative industries focus on the creation and exploitation of intellectual property such as art, film, music, dance, theatre, advertising, broadcast media, software development, and computer and related services.
- Experiencing a ***dual economy***, as a dynamic of various systems for money, including.
  - Virtual economy (e.g. Linden currency)
  - A real economy with currency in use in the real world (e.g. when a product is chosen in a virtual shop, the customer is taken to the "real" e-commerce site for the actual purchase).
- Offering opportunities for ***education and training***.

Hence, we look at entrepreneurship in relation to ***upstarts***, such as small-scale development projects and companies existing ***in 3D Internet environments*** where there is a ***circulation of "real world" money*** and other monetary systems.

However, entrepreneurial projects and SME companies may be funded by larger companies, supported by grants, involve research collaborations with inventors and so are not “just” small start-ups.

### ***International Entrepreneurship Related to the Internet***

The cases studies we have done have roots or ties with the Nordic region, but their services and products are online (or on the Internet) and extend beyond geographic regions as such. Their markets are global. They represent international entrepreneurship, which McDougall and Oviatt (2000) defined as: A combination of innovative, proactive, and risk-seeking behavior that crosses national borders and is intended to create value in organisations.

Moreover, the literature on **online communities** is relevant as it point to the following motivations for why people generally get involved (Bagozzi and Dholakia 2006; Lakhani and von Hippel 2003; Shah 2004; 2006):

- Satisfying own needs
- Reputation and status
- Affiliation and identity
- Creativity and enjoyment
- Career concerns
- Learning
- Ideological attitudes

### ***Thoughts on Comparing Best Practices of Entrepreneurship***

We did consider developing a matrix to enable comparison best practices of entrepreneurship but the factors seemed too disparate. Ultimately, we decided to explore what a few entrepreneurs are looking for when creating / collaborating in virtual worlds and uncover *their* success criteria, formation of social networks and the way they leverage affordances of technologies.

We looked at literature on entrepreneurship and its focus on success criteria, outcomes, determinants, online communities for inspiration. Below is a synthesis of the presentation of terms and directions, see more in our “Best Practices” report 2010.

### *Success Criteria*

- Preliminary, we identified success criteria as apparent in the research on entrepreneurship (Boojihawon 2004; Cressy 2006; Kakati 2003; Roure and Maidique 2002; Stuart and Abetti 2002).

### *Outcomes*

- Performance measures such as sales, market share, costs, ROI

### *Determinants*

- Uniqueness of products / services
- Size of venture team
- New venture matching the technical and market experience of the team
- Enthusiasm / capacity for work
- Importance of the entrepreneur
- Early market entry
- Venture capitalists on board
- Network relationships
- Surviving the first two and a half years of the “valley of death”