

Virtual Worlds, Virtual Economies, Virtual Institutions

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1 Introduction

Virtual worlds are now a reality. Virtual worlds such as the growing Second Life (secondlife.com) and Entropia Universe (www.entropiauniverse.com), allow everyone to create a digital character representing themselves and interact with other computer-generated individuals, landscapes, and even virtually-run global businesses in real-time. Fascinatingly, both endogenously produced economies and social orders are emerging in these virtual worlds. In this article, we review both the past and present of virtual worlds, in the hopes of raising worthwhile research questions to consider for the future of such immersive spaces.

Max Headroom, a cyberpunk-themed television show in the 1980s, always began an episode with the tagline “20 Minutes into the Future.” The central premise of the show was that Edison Carter, a journalistic news reporter, had managed to create a computer-generated alter-ego of himself by the name of Max Headroom. By virtue of being a digital, software-rendered entity, Max was able to travel freely across all the networked computer systems of the future and, through television monitors, converse with real-world counterparts. Less than 20 years later, Max Headroom is now a reality. Virtual worlds are not some sci-fi pipe dream or small fad. The commercial boom of Internet adoption in the mid-1990s recognized the reality of networked computer systems that span the globe (Barrett and Konsynski 1982; Winograd and Flores 1986). Satellites and geographical information systems, such as Google Maps (maps.google.com) allow us to pinpoint precise locations of our real-world (Clippinger 1999; Melville et al. 2004). As of late May 2007, there are over 6,200,00 registered participants in Second Life (six months earlier

there were 1,700,000 participants) and the world is growing at a rate of 15% monthly (BusinessWeek 2006o; NYTimes 2006b; Roberts 1986).

Reuters has established a virtual headquarters in Second Life, to broadcast news related to both the virtual world and the “outside” real world. National Public Radio has broadcast sessions held in Second Life, including a virtually performed, live concert with Susanna Vega. IBM has hosted a virtual reunion of former employees in Second Life and announced in December 2006 a plan to design twelve virtual islands for its corporate meetings and employee events. Wikipedia (www.wikipedia.org) lists more than 40 businesses operated in Second Life. Further, a few real-world universities are even establishing islands in virtual worlds and offering classes, to include INSEAD and USC-Annenberg. Harvard Law School’s CyberOne course is taught partly on Berkman Island, virtually located within Second Life (BusinessWeek 2006k 2006l 2006o; Wired News 2006b).

1.01 Virtual Currencies

Virtual worlds are not just about digital characters (labeled “avatars”) interacting with each other for entertainment on virtual islands, in virtual cities, or across virtual landscapes. Virtual worlds include virtual currencies that allow participants to buy and sell goods and services. An average of \$1,500,000 (U.S.) is exchanged among Second Life’s virtual characters daily. Second Life includes an endogenously maintained currency exchange (known as the LindeX) that trades an average of \$100,000 (U.S.) a day between the Linden dollar (L\$) and foreign currencies. For most of 2006, the Linden dollar traded at about L\$270 per U.S. dollar (BusinessWeek 2006a 2006n; NYTimes 2006b).

For other virtual worlds, currencies do not float, but are traded at fixed rates. For example, the virtual currency of Entropia Universe(the Project Entropia Dollar or PED) does not float, but is fixed, currently exchanging at 10 PED to the U.S. dollar. Entropia Universe is wildly popular in Europe, with more than 500,000 virtual inhabitants. In 2005, more than \$160,000,000 (U.S.) was exchanged among the participants in Entropia Universe and, in 2004, the Entropia Universe

entered the Guinness World Book of Records for the most expensive virtual item ever sold (\$26,500 U.S.) at that time (Castronova 2005).

Another virtual world, Cyworld (www.cyworld.com), includes a virtual currency called “dotori which is literally translated to mean acorns. One acorn costs 100 Korean won, approximately \$0.10 (U.S.), and virtual participants are encouraged to use their acorns to purchase virtual items such as clothing, decorations, musical instruments, songs, videos, and other entertainment goods for their digital avatars. Most of Cyworld’s items are time-limited, and automatically disappear once that time has expired. Cyworld includes 25% of the total population of South Korea as registered participants, with an average of 20 million daily unique visitors. Cyworld’s revenue in South Korea was estimated to be around \$300,000 (U.S.) daily in 2005. In late August 2006, Cyworld launched a similar virtual world aimed at a North American audience (BusinessWeek 2006e 2006h).

1.02 Virtual Businesses in a Virtual World

Where there is real-world money being exchanged in virtual worlds, real-world businesses are close behind. In November 2006, real-world public relations firm Edelman (www.edelman.com) and the Electric Sheep Company (www.electricsheepcompany.com) announced a competition for the best business plan for a virtually-run business in Second Life. Dell, Cisco Systems, Xerox, and Nissan all have storefronts within Second Life. Second Life’s interactive technology lets participants create virtual objects like clothes or storefronts from scratch using basic building blocks known as prims, akin to lego pieces. The announcement of a business plan competition was done virtually to an assembly of virtual characters within Second Life, on an island “built” by Electric Sheep. The winner of the competition would receive L\$350,000 in venture capital (about \$1300 U.S.), strategic guidance from Edelman, and use of a virtual “island” for six months to run the proposed business within Second Life (BusinessWeek 2006o; NYTimes 2006b).

Weber Studio (www.aimeeweber.com) is an example of a combination real-world and virtual business, already running successfully in a virtual world. A designer and artist, Aimee Weber

and her staff (including at least three other employees), design and sell virtual products at - locations in Second Life for real-world businesses that want to use Second Life for marketing, education, and other purposes. The studio has been employed by the United Nations, American Cancer Society, American Apparel, and the National Oceanic and Atmospheric Administration. The studio has also designed a virtual line of clothing (for virtual avatars in Second Life) that has been successful enough to garner attention from Fortune Magazine and Women's Wear Daily (BusinessWeek 2006b 2006f).

It should be noted that the virtual worlds discussed so far are not Massive Multiplayer Online Role Playing Games (MMORPGs) such as Everquest (www.everquest.com) or World of Warcraft (www.worldofwarcraft.com). While MMORPGs are also virtual worlds, their focus is more on creating an entertaining, fantasy-based virtual world where participants adventure together. Second Life, Entropia Universe, Cyworld, and other virtual worlds are somewhat different in their focus to create computer-mediated, shared experiences where participants can interact together, but there is no expressly developed plot or storyline. Instead, the virtual participants themselves determine what they want to do, their individual goals, and how they each want to shape their virtual worlds. That said, the growing popularity of strict MMORPGs should be noted, as World of Warcraft has over 7,500,000 paying monthly subscribers as of November 2006. In February 2005, EverQuest II allowed a brief commercial promotion where virtual avatars could place an order for a real-world pizza delivery from within their virtual world (Bartle 2003; BusinessWeek 2006c 2006d).

Real-world commercial businesses are also creating virtual worlds. Music television, such as MTV (mtv.com), is also hoping virtual businesses begin in virtual worlds. MTV built a virtual world called "MTV's Virtual Laguna Beach" where participants can live the MTV Laguna Beach television show alongside friends and fans. The service is in beta and is free. MTV intentionally solicited corporate sponsors to use the game environment to feature product-placement and commercial advertisements inserted into the three-dimensional experience. Virtual and real-world items, including new music, videos, and virtual clothing can be bought using virtual currency (MTV\$). Participants earn MTV\$ for participating in product-placement activities, and can also use real-world credit cards to purchase MTV\$ at the rate of MTV\$180 to

one U.S. dollar. Separately, real-world music bands (such as Duran Duran) are planning virtual concerts in Second Life and real-world musicians already are performing virtual concerts before virtual participants, earning about \$40 (U.S.) a show (BusinessWeek 2006e 2006i).

Virtual worlds also are being embraced by young children. Neopets (www.neopets.com) is an online virtual pet game which allows players to create and take care of 54 virtual pets. This includes virtually caring for and feeding the pets in the virtual worlds of Neopia, using virtual currency called Neopoints. Neopoints are earned through playing games or won through a diverse array of contests and activities on the site. Like MTV, such contests and activities include product-placement and commercial advertisements for real-world offerings. Neopets participants can choose to collect certain virtual items, often rare and expensive, and display them in a virtual gallery. Neohomes can be built after an owner buys a plot of virtual land, using the points they have earned from visiting the different product placement games and activities in Neopets. Each virtual Neohome room costs Neopoints to build, and furniture may be put in and arranged. Extensions such as lighting, flooring, and even Neohome insurance can also be purchased. Participants have created several virtual bartering exchanges for virtual Neopets items. Real-world Neopets products are also sold. In May 2005, Neopets cited 35 million unique participants, and 4 billion web page views per month. At the time, 20% of Neopet's participants were over 18 years old, with the median age of the remaining 80% of participants about 14 years of age (Bartle 2003).

Banks have been established in virtual worlds. Entropia Universe has negotiated agreements with real-world banks to allow participants to use real-world ATM's to withdraw money from their virtual accounts (converted into real-world currency). Additionally, Meta Bank is a virtual bank that operates entirely within Second Life. Clients can deposit and withdraw virtual funds. Meta Bank makes money by loaning virtual L\$ to allow participants to purchase land in Second Life and charges interest on such loans. Meta Bank was endogenously formed by the participating community of Second Life and is an interesting example of virtual micro-credit lending in a virtual world. Real-world bank Wells Fargo has a presence in Second Life, though its focus is on providing a series of interactive islands to teach virtual participants the value of saving and maintaining good credit in the real-world (BusinessWeek 2006a 2006n).

1.03 Real-World Government and Virtual Worlds Collide

With real-world businesses moving to virtual worlds, real-world governments are now also becoming interested in virtual worlds. Their top interest is the possibility of real-world taxation of virtual transactions in virtual worlds. In October 2006, the U.S. Congress began debating rules to tax the exchange of virtual goods and items in virtual worlds such as Second Life. Tricky points like aside (such as where exactly is a virtual world located? do you tax where the servers are located or where the real-world counterparts of virtual avatars abide?) virtual worlds also worry governments with their ability to provide tax shelters. In Neal Stephenson's 1999 novel, "Cryptonomicon," a futuristic character is advised to convert all of his money into a virtual currency in cyberspace. Nowadays, this is a real possibility. Since October 2005, the U.S. Department of Homeland Security has owned a secluded, virtual island in Second Life and is reportedly monitoring transactions in the virtual world for aberrant activities (NY Times 2006b; Stephenson 1999; Wired News 2006b).

In November 2006, the first virtual millionaire was announced in Second Life. Anshe Chung (www.anshechung.com), who is the virtual avatar of real-world Ailin Graef, spent more than two years in Second Life developing virtual islands, crafting landscapes, and providing virtual housing for paying participants with her real-world husband, Guntram Graef. With over L\$270,000,000 (\$1,000,000 U.S.) in assets, Anshe Chung was proclaimed by CNN and other news sources as probably the first "virtual Rockefeller." Her virtual company has more than 10 real-world employees to help design virtual real estate, and is registered in the real-world in Hubei, China. Intriguingly, participants in Second Life wanted virtual neighborhoods that included some order to their design and structure, so Anshe Chung (Ailin Graef) began creating the equivalent of gated communities, complete with zoning rules. For example, she opted not to allow malls or clubs in certain regions of the virtual world and limited the heights of buildings. Philip Rosedale, the CEO of Linden Lab (the company that produces Second Life) stated to a real-world journalist that "she [Anshe Chung] is the government." (BusinessWeek 2006c 2006n).

Another example of endogenously produced government in Second Life occurred in 2003. Participants in Second Life (a community with less than 15,000 members at the time) were concerned with Linden Lab's policy of taxing residents for virtual objects they created. Originally, individuals were allowed to build virtual objects in the virtual world, but were charged a monthly fee for the server space associated with these creations. Individuals also did not retain the property rights associated with their creations, but rather the operating company (Linden Lab) did. In July 2003, a virtual revolution took place in the virtual world, where rebellious virtual participants dressed in colonial garb and covered the virtual world with tea crates. The virtual avatars complained that they were "Born free: taxed to death!" (Wired News 2006b).

In November 2003, Stanford law professor Lawrence Lessig consulted with Linden Lab about the virtual world revolution. He suggested that Second Life abolish its tax on virtual objects and allow residents to retain intellectual property rights over their creations. Linden Lab followed this advice by bestowing personal property rights to virtual residents and abolishing the property tax, opting only to charge a real estate tax in the virtual world. Three years later Second Life grew from a community of 15,000 to more than 6,200,000 participants. Lawrence Lessig was later dubbed the "Thomas Jefferson" of Second Life by Wired Magazine (www.wired.com).

Interestingly, all these events are akin to the premise of another Neal Stephenson novel called "Snow Crash" (1992), in which a virtually shared world called the "metaverse" allows participants to globally connect through computer-mediated interfaces and interact virtually. The virtual "metaverse" includes businesses and some sense of social order independent of, and in several ways transcending, real-world governments. Of note, "Snow Crash" also predicts the waning importance of real-world governments (Stephenson 1992; Gibson 1993).

2 Understanding the Past to Predict the Future

What does the future of virtual worlds bode for business, social, and political institutions? This is an important question to consider for academic researchers and interested practitioners in the phenomena associated with virtual worlds. Even if specific virtual worlds wax and wane, the

phenomena of virtual worlds increasingly will be incorporated both into computer-mediated and real-world social activities. In fact, future web browsers may rely less on two-dimensional, textual navigation and more on three-dimensional, interactive, embodied experiences akin to virtual worlds (Winograd and Flores 1987).

The questions surrounding present and future virtual worlds address whether we will see the rise of endogenously formed virtual governments? How will real-world governments respond to virtual worlds, virtual businesses, and virtual governments? Will real-world and virtual laws and law enforcement intersect and (quite possibly) collide?

Before we can answer those questions, however, it is worthwhile to reflect on the history of virtual worlds, including the success and failures of different attempts and technologies. The earlier introduction is only a limited view into the current patterns surrounding present-day worlds such as Second Life, Entropia Universe, and Cyworld. Several attempts at virtual worlds began in the early 1990s, some of which still exist in some form today. Understanding the events that led to this present set of phenomena will help in understanding deeper issues involving the intersection of real-world and virtual governments and possible predictions for the future.

2.01 1991, ImagiNation Network (INN)

The ImagiNation Network was launched in 1991 as two-dimensional online gaming network by Sierra On-Line with the idea of providing dial-up subscribers from all over the United States a place where they could “play games, make friends and have fun.” INN was comprised of several lands, each one featuring a different theme and selection of games and services. Lands included ClubHouse, LarryLand, MedievaLand, SierraLand, FunHouse, and Arena. Participants were represented by a persona which they assembled using a built-in facemaker on their computer. The facemaker was detailed, with enough different options to construct over 84 million unique personas. INN also featured an electronic post office, many bulletin boards, chat rooms, and Sierra On-Line boasted of having “more than 200 groups, clubs and special events online.” Tournaments were held for many games in which winning players and teams could win prizes (Bartle 2003).

A unique feature included INN Staff, known as “Hosts,” which showed new subscribers the ropes, digitally introducing new participants to regular members. Originally dubbed The Sierra Network, the initial venture proved unprofitable and Sierra On-Line sold half-interest in the effort to AT&T for \$50 million. AT&T renamed the effort INN. INN was subsequently acquired in 1996 for \$15 million by America On-Line, which shut down the network later that year. In 2003, a new group of developers started an effort to recreate INN, with development still ongoing (www.fauxinn.com).

2.02 1994, The Palace

The Palace was designed as a two-dimensional interactive chat application that enabled expressive avatars, chat, and sound. The product was launched in 1994. Participants were represented by spherical emoticons, but could also wear bitmaps called props. Electronic messages were exchanged and appeared as chat bubbles above their avatar. By clicking on “doors,” participants could travel to different rooms. In some rooms, participants were allowed to paint on the virtual walls (Castronova 2005).

One of the unique features of the Palace was that the server software was given away for free and ran on consumer PCs, rather than being housed in a central location. Official support for the Palace software died with the dot-com “bust” circa 2001. Many members of the community now consider the Palace software abandoned and individually provide unofficial support for past versions. A new effort called “Hive 7,” launched in 2005 in an attempt to incorporate similar elements of the Palace into a web browser, is now in beta (www.hive7.com).

2.03 1995, Active Worlds (AW)

Active Worlds (AW, www.activeworlds.com) was initially designed as a three-dimensional, virtual reality platform. The platform is still in use, with regular updates, and was initially called WebWorld with the original goal to be a 3D web browser. The effort was later dubbed AlphaWorld, and renamed again in 1995 as AW. Instead of creating a website, a participant can

construct an office, building, or area to display products or information. Participants assign themselves a unique name, login, and explore 3D environments that other participants have built. The AW browser has web browsing capabilities, voice chat, and basic instant messaging. Participants can own worlds and develop 3D content. AW has two ways of entering its universe: as a free tourist or as a paid citizen (Bartle 2003).

A unique feature of AW includes bots; bots are applications developed using the AW Software Development Kit (SDK). Some bots allow participants to automate simple tasks, such as weather, chat relay, giving tours and information, complex property management, and more. Bots can engage in chat, play games, and can be developed which interact with databases. In June 2006, AW released the public world server version 4.1, with over 600 virtual worlds presently using this software.

2.04 1998, There

There (www.there.com) is a subscription-based Internet service, consisting of an immersive three-dimensional virtual world complemented by two-dimensional web-based services. Created in 1998, There describes itself as an “online getaway where you can hang out with your friends and meet new ones.” New participants enter the community by choosing a unique name and a male or female avatar. The avatar's name and gender are permanently set, but various attributes such as hair, head, body, skin, eyes, and clothing can be changed (Bartle 2003).

Participants can chat, play games, own virtual pets, and explore There's cyber-landscape either on foot or by vehicle. Two membership options are possible, basic membership (free) or premium membership (paid). With either membership, a There participant can purchase Therebucks (Tbucks) at a price of 1,800 Therebucks for each U.S. dollar. There includes an economy of bought and sold member-created items. Since the rise of Second Life, There has also experienced an influx of new visitors seeking to develop within the virtual world, demonstrating the potential for a peaceful duopoly (or more) of virtual worlds to co-exist simultaneously, attracting different audiences.

2.05 1999, NeoPets

As already mentioned, NeoPets (www.neopets.com) is an online virtual pet game. In 2005, NeoPets was purchased from its original producers for \$160 million (U.S.) by Viacom, a media conglomerate with various worldwide interests in cable television, satellite television, and movie production. Participants in NeoPets are encouraged to virtually care and feed their pet creatures. To do so, they participate in interactive games involving product-placement and commercial advertisements paid for by real-world corporate sponsors. Neopets was cited as having over 35 million unique participants in May 2005. A majority of NeoPets participants are between the ages of 10 to 17, though a number of adults are also involved (Bartle 2003).

2.06 2002, The Sims Online (TSO)

The Sims Online (www.thesimsonline.com) is a massive multiplayer online real-life game variation of Maxis's popular computer game The Sims. The product was launched in 2002. Participants are in complete control of a simulated person, referred to in the game as a Sim. A player can create up to three Sims, each existing on different game servers, known as Cities. TSO has seen only a fraction of the subscription numbers aimed for by Electronic Arts (who published the game and virtual world). One reason is that commercial TSO participants failed to cooperate as well as early beta testers did, creating disruptive effects in the online world. Another reason is that TSO does not allow participants to create and use custom objects online. Many reviewers have described the online game as dull and more like the world's largest chat room (Castronova 2005).

TSO includes an online currency, the Simolean. Players can earn Simoleans through in-game jobs, either in a restaurant, at a robot factory, or at a nightclub. However, this currency has been rather unstable, due to inflation caused by third-party programs that exploited money-making objectives in the game. Third-party programs could complete rounds of money-making objectives hundreds of times faster than if the rounds were completed by human players. A patch was eventually introduced by Electronic Arts, though not all of the programs have been blocked and consequently many TSO players have left the game. There have been no updates since 2005.

2.07 2003, Second Life (SL)

Also referenced earlier, Second Life (secondlife.com) is a partly subscription-based 3D virtual world, launched in 2003 by Linden Lab. The SL “world” resides in a large array of servers that are owned and maintained by Linden Lab, known collectively as “the grid.” The SL client program provides participants (referred to as Residents) with tools to view and modify the SL world. Participants start with a standard avatar model, which they can customize all aspects of using both the SL client program and by purchasing other customizations produced by other Residents using SL’s in-game currency, Linden Dollars (L\$). Residents may purchase L\$ directly through the client program, convert between L\$ and U.S. dollars through the LindeX Currency Exchange, or opt to use other third-party currency exchanges (BusinessWeek 2006a 2006b).

The ratio of U.S. dollars to L\$ fluctuates daily as Residents set the buy and sell price of L\$ offered on the exchange, and it has fluctuated between L\$240 and L\$350 per U.S. dollar during the first 11 months of 2006. SL also includes virtual intellectual property rights. Participants build and own personal property. This property can then be tagged as allowing anyone to make a copy, just the original designer to make a copy, or no copies to be made. Also in SL, a First Land program exists to reserve small blocks of land for first-time land buyers, intending to decrease the cost of land for new premium accounts. A Resident pays a fixed fee of L\$1 per square meter for a 512 square meter plot (BusinessWeek 2006c, NY Times 2006a).

In November 2006, SL experienced two disruptive events to its virtual world. The first disruptive event was a segment of malicious code designed by SL participant. The code (dubbed “copybot”) made copies of all virtual items belonging to other virtual participants. For virtual businesses, this event was potentially disruptive as copies of their virtual items could be inappropriately copied and “virtually stolen.” Two weeks later, distribution of the malicious code eventually declined, though Linden Lab publicly said it would not resort to virtual world “law enforcement” of such malicious activity. Instead, Linden lab would be happy to refer any complaints to real-world law enforcement under the U.S. Digital Millennium Copyright Act

(DMCA). Linden Lab also said it hoped SL could rely on the normative values and social pressures generated by members of the virtual community to discourage malicious behaviors.

The second disruptive event in SL involved an additional segment of malicious code which produced the appearance of “grey goo” in the virtual world when participants attempted to grab spinning rings. The “grey goo” would consume increasing amounts of processing-time in the virtual world, on both the individual’s and Linden Lab’s computers, eventually causing Internet connections to be dropped. In this instance, Linden Lab developed and released computer code that fixed the “grey goo” problem and resolved the loss of connections to the virtual world (BusinessWeek 2006m).

2.08 2003, Entropia Universe

Entropia Universe (www.entropiauniverse.com), also highlighted earlier, is an online virtual universe designed by Swedish software company MindArk. The Entropia Universe is a continuation of the Project Entropia effort started in 1995 and launched in 2003. Entropia Universe currency (Project Entropia Dollars, or PED) can be redeemed back into real world funds at a set exchange rate of 10 PED for each U.S. dollar. Participants may withdraw their accumulated PEDs back into real world currencies according to the fixed exchange rate. Entropia Universe can be downloaded and played for free. For Entropia Universe, the virtual community has produced several real-world business marriages. In 2006, Entropia Universe introduced the ability for players to withdraw the real-world currency equivalent of their PED funds directly from any real-world Versatel ATM machines.

When someone enters Entropia Universe for the first time, their only possession is a bright orange jumpsuit. This makes more involved interactions difficult, if not impossible, without depositing funds. Hence, it has been argued that the real cash economy of Entropia Universe makes participants view their time online more “seriously” than traditional online games. Consequently, they are more secretive about their knowledge of game mechanics and economic strategies (Argote and Ingram 2000). It has also been argued that the Entropia Universe includes a constant struggle among players to wrestle an economic advantage through greater

understanding of the way things work in the game, leading to class struggles among players (Castronova 2005).

2.09 2006, DotSoul

DotSoul (www.dotsoul.net) is an immersive 3D virtual reality platform, with the stated goal of “releasing people’s subconscious” and offering a dreamscape or playground of the mind where people creatively interact, role-play and build virtual works which bear the stamp of their personal identities. Participants can join DotSoul for free if they agree to an explicit code of conduct that mandates (1) respect for everyone, (2) behavior consistent with a PG-rated world because, like the real world, it involves children (and a huge range of cultural experiences), and (3) no VR [virtual reality] universe or world bashing. DotSoul participants altruistically are told to “support everyone, including the competition.”

Once agreeing to the code, DotSoul participants gain admittance and are free to create using a wide range of interactive media, including three-dimensional graphical objects. Dotsoul has been compared with myspace.com and youtube.com due to its emphasis on social networking and user-generated content. However, unlike these sites, Dotsoul currently does not run on a revenue-producing model and unlike sites such as Neopets and Cyworld, is strongly anti-corporate and non-commercial (BusinessWeek 2006e).

2.10 2006, Cyworld

Cyworld (www.cyworld.com), mentioned earlier, is a community site which began in South Korea, where reports indicated that as many as 90% of South Koreans in their 20s are registered participants. The main feature of Cyworld is the service called minihompy, which combines a photo gallery, message board, guestbook, video, and personal bulletin board. The minihompy combines personal, virtual rooms similar to myspace.com with social network features similar to those at facebook.com. The Cyworld minihompy is where the participant's cyberspace avatar, or “mini me,” lives.

Cyworld participants can choose to buy wallpapers, clothes for their virtual counterparts, furnishings, background music, banners, fonts and other decorations for their minihompy. To buy these items, participants must first exchange real world currency with Cyworld money called “dotori” or acorns. Prices vary from about two acorns (\$0.20 U.S.) for a virtual wall painting to 30 acorns (\$3.00 U.S.) for one year’s use of a background for a participant’s homepage. In 2006, Cyworld received the Wharton Infosys Business Transformation Award for its society-wide transformation of interpersonal interaction (BusinessWeek 2006h).

2.11 2006, MTV’s Virtual Laguna Beach

Also highlighted earlier, MTV’s Virtual Laguna Beach (www.mtv.com) is a virtual world where participants can live the MTV Laguna Beach television show alongside friends and fans. Participants can create individual avatars that they customize. This virtual world involves product-placement and commercial advertisements paid for by real-world corporate sponsors. Participants are allowed to play out elements of the MTV show and participate in special events, competitions for prizes, group chats, and virtual shopping sprees. Fashion and car companies are also using MTV to place virtual renderings of real-world items, for both conducting marketing campaigns and testing the success potential of new offerings prior to real-world production.

2.12 2006 and beyond: Open-Source Efforts

Several open-source efforts are also underway to provide virtual worlds for participants. These efforts, such as the Open Croquet Project (www.opencroquet.org) or the Solipsis effort (solipsis.netofpeers.net), are intriguing because they are not sponsored by any particular corporate or public group, but rather seek to provide the tools for individuals themselves to create interactive virtual worlds for others. The goal for these efforts is to facilitate creation of public virtual worlds, as an alternative to virtual worlds owned by private companies.

Most of these efforts believe in a peer-to-peer approach to virtual worlds, where individuals could each host part of a larger virtual world on separate computers, linked together by Internet connections, such as the Metaverse Project (metaverse.sourceforge.net). Some efforts involve

thick clients that have to be installed on computers, whereas others rely only on a thin, web-browser interface. What is clear from these open-source efforts is that the ability for individuals to create their own virtual worlds for millions of other individuals is on the rise. The ability to form several decentralized, peer-to-peer virtual worlds is also on the horizon. Individuals will be able to move between parts of multiple, unique virtual worlds located on physically distinct servers and potentially operated by different individuals or organizations. Virtual avatars will be able to exchange virtual items and currencies across multiple, virtual worlds. Additionally, some of the open-source offerings provide the possibility of navigating such worlds akin to using a web browser to navigate the Internet, such as the Virtual Object System effort (interreality.org). The way we choose to “surf” the Internet may dramatically change from hyperlinked, textual navigation, to a more embodied, three-dimensional virtual experience.

3 Towards the Future: Research Questions Worth Considering

The vision created in Neal Stephenson’s novel “Snow Crash” is already in existence in the virtual world today. Multiple, interactive, three-dimensional digital worlds, complete with shared experiences, sights, and sounds, exist and are populated by millions of participants daily. Virtual items are being bought and sold in virtual worlds. Individuals are forming businesses in virtual worlds. People are forming friendships, relationships, and partnerships in virtual worlds. Virtual worlds are more than games or media-related phenomena, representing an entirely new way to experience the Internet both as an individual and with a group. Virtual banks and currency markets have been formed and are actively used. There are some existing virtual worlds (such as Second Life) and other development efforts, like Kaneva (www.kaneva.com), which seek to provide blank “canvases” where participants can create virtual worlds for other virtual characters to experience. Some virtual worlds merge and blur the distinction between real-world and virtual products, services, or activities, to include virtual creation of identical, real-world locations, products, or organizations (Stephenson 1992; BusinessWeek 2006k).

Virtual participants are creating new rules and endogenously forming new social institutions in their virtual worlds. This includes the formation of a number of ad-hoc virtual governments, some of which have experienced virtual revolutions. Thus, what emerging business, information

systems, and political issues does the future have in store – and what interesting questions of virtual worlds can be asked and investigated?

3.01 The Importance of Body

“I think, therefore I am” is a famous (albeit translated) quote from Descartes. For virtual worlds, there is an interesting extension not only of an actual human mind translated into a virtual body, but there is also the feedback of a human mind seeing oneself as a body present in a virtual world. Having a body is important to how the human brain comprehends and understands not only the actions of an individual, but also the actions of others. In the last 10 years, neurobiological research has uncovered some fascinating insights into a phenomenon known as “mirror neurons.”

Mirror neurons were discovered by accident. While recording the brain activity that occurred when a primate grabbed a banana, one of the researchers also grabbed a banana during a break. The primate’s neurons fired in a pattern similar to one if the monkey was grabbing the banana. Surprised, neurobiologists discovered that regardless of whether the primate or another primate performed the action of grabbing a banana, a similar pattern of neurons fired. In a sense, the primate’s brain was mirroring the actions of either self or others. The pattern of neurons that fired was specific enough to distinguish between hands reaching to grab a banana vs. empty space. Moreover, the pattern of neurons was specific enough to distinguish between the two actions even if the primate was allowed to first see the presence vs. absence of a banana and then this space was covered with a cloth (Kakei et al. 2001).

Neurobiologists believe that mirror neurons not only help the brains of primates (including humans) identify and recreate cognitively the local actions of primates in our environment, but also help predict the intended actions of others based on visual cues. The fact that mirror neurons fire regardless of whether one’s own body or an outside body is performing the action suggests that primates cognitively internalize actions, akin to guessing “what behavior would I be doing if I were that individual?” Intriguingly, mirror neurons are thought to be located in the part of the brain where vocalization patterns are controlled as well. For humans, having mirror neurons

proximate to the language center of the brain is an obvious advantage: we can give words to the actions (and meanings) we perceive (Weick and Roberts 1993). What either our body or the body of another does, we can predict, identify, and name (Kakei et al. 2001; Jeannerod 2004).

In contrast to research on mirror neurons, for academic researchers, the Internet has been about virtually disconnecting from one's body. Websites such as Amazon.com and Craigslis.com are successful because they lower search costs involved with finding a particular product or service. Through digital, textual navigation facilitated by hyperlinks and graphics, the Internet frees individuals from having to visit different stores to check physically on the price and availability of a product. Additional websites like eOpinions.com allow individuals to report their personal assessment of a product or service so that later other individuals can view these reviews. Individuals can shop, compare stores, read reviews, and even initiate product returns – all without having to leave home. Streaming audio and video provide additional media that allows remote viewing of products, news events, and geographical locations.

The Internet frees individuals from the physical constraints of their body (Galbraith 1982; Huber 1990). At the same time, the disembodied nature detracts from shared, group experiences. Even with Internet chat rooms, the focus is more on the words (and emoticons) being typed by different individuals, than any simulated body language or physical expressions. Video conferences allow some body language to be shared, but only in the limited confines that two or more real-world people are sharing images of themselves and their location in the real world. When individuals shop at Amazon.com, their Internet experience is theirs uniquely and they do not “see” thousands of other individuals shopping online at the same time. There is no line of individuals waiting for an online store to open, nor a visual rush of people running to grab a particular book.

Virtual worlds challenge this disembodied paradigm of the Internet by returning a focus on the importance of body. Research into both mirror neurons and body language demonstrates that seeing one's body and that of others is important to humans. Virtual worlds populated by virtual avatars allow humans to share group experiences in ways that transcend real-world video conferencing. Both the virtual world and the virtual avatars themselves are synthetic and can be

modified such that the world no longer has to resemble the real world (Hevner 2004). Equally, an individual's avatar does not have to look like his or her real-world counterpart (Lamb and Kling 2003). At the same time, virtual worlds seem to relate to fundamental structures of primate brains that link visual cues to actions and predicted intentions, and these actions and intentions to the language center of our brains.

3.02 Virtual Property, Property Rights, and Taxation

In Second Life, Cyworld, and other virtual worlds, individuals want to create their own virtual homes. They are even willing to pay real money to purchase and decorate their virtual homes. As mentioned, virtual avatar Anshe Chung (www.anshechung.com) has made over \$1,000,000 designing and selling customized virtual real estate in virtual worlds. Her company includes more than 10 real-world employees. Since her customers wanted an order to their neighborhoods, Anshe Chung began to endogenously include zoning rules to place parameters on the height and types of buildings allowed (BusinessWeek 2006e 2006n).

In addition to an initial purchase price, most virtual worlds charge a reoccurring, monthly fee for virtual properties, and virtual properties exist only as long as the virtual world continues to exist. Should a participant stop paying the reoccurring fee or permanently leave the virtual world, his or her virtual property is repossessed by the operators of the virtual world. Equally, the personal property of virtual avatars often is linked to their continued existence.

For Second Life, following the "revolution" in July 2003, virtual residents were afforded personal property rights and the private property tax was abolished to be replaced by a virtual world, real estate tax. Real-world firms now pay upwards of \$20,000-\$50,000 (U.S.) to establish virtual headquarters in Second Life. Participating firms include Reuters News, Sony/BMG Music, Wired Magazine, and Starwood's W Hotels. Their costs include developing the real estate and programming any buildings. Most virtual worlds do not charge for continued ownership of personal property outside of real estate. However, many charge a membership fee which could be equated to a "right to exist fee" for the individual avatar in the virtual world (BusinessWeek 2006g 2006i; Wired News 2006b).

Second Life and other open-source virtual worlds allow individuals to build their own property and avatar customizations, such as clothes, skateboards, cars, and helicopters, from scratch using basic building blocks. Most virtual worlds include virtual item tagging that labels virtual items in specific ways, such as allowing anyone to make a copy, just the original designer to make a copy, or no copies to be made. Often virtual worlds include “sandboxes” where free items, made by virtual participants, can be obtained by other interested virtual participants. In a virtual world, after a virtual item has been designed once, the cost of manufacturing copies is zero. Sometimes the virtual world can get cluttered with discarded virtual items and junk, although often code exists which will decay or delete virtual items if they are left discarded for too long a period of time (NY Times 2006b).

3.03 Virtual Laws and Law Enforcement

Virtual laws and law enforcement already exist in virtual worlds. Several virtual worlds include real-time censorship of what can be said inside the virtual world. Individuals attempting to type forbidden words will find the words scrambled or deleted in the virtual world. Individuals can also “report” individuals who behave badly, to include harassment or bad behavior. Such reports are investigated by a systems administrator or trusted volunteer appointed by the real-world organization hosting the virtual world (Mayer et al. 1995; Lamb and Kling 2003). Penalties for breaking the virtual laws or “code of conduct” for virtual worlds can include removal of property, temporary ban from entering the virtual world, or permanent erasure of the virtual avatar. Some worlds include reputation points assigned to each individual. Virtual avatars then can view the reputation points of other individuals and suggest awarding additional points for kind acts or removal of points for bad behavior.

Virtual worlds also strive to discourage exploitative behavior in the virtual world, which includes misusing computer-generated code to earn or counterfeit virtual currency. The Sims Online suffered the equivalent of an virtual economic crash when third-party programs were developed that could complete rounds of money-making objectives hundreds of times faster than if the rounds were completed by human players. Most participants left the virtual world after the

virtual currency became massively inflated. Some worlds actively search for and remove virtual avatars focused on the task of exploitive “farming” of virtual currency through repetitive behaviors. These repetitive behaviors can be performed either by a computer-generated program or by real-world individuals willing to interact in the virtual world for real-world payments. The stability of a virtual currency in a virtual world is important to both growth and retention of the participating community (BusinessWeek 2006c 2006h).

Second Life and other virtual worlds have experienced virtual crimes and permanently banned or erased virtual avatars for the offenses. Such crimes include virtual mafia racketeering, publication and distribution of neo-Nazi propaganda, cyberterrorism (to include distributed denial-of-service attacks), retail fraud (false payment using virtual currencies), and non-consensual assaults of other virtual avatars. Such incidents are usually handled by the organization hosting the virtual world (BusinessWeek 2006m).

3.04 Virtual World and Real-World Work

To date, most virtual worlds have involved either focused or unscripted play. Only within the last year have virtual worlds become places where virtual businesses have grown to make real-world profits. An increasing number of real-world businesses and non-profit organizations recognize that virtual worlds provide unique opportunities to interact with participants.

Just as the initial hyperlinked text and later graphical forms of navigating the Internet involved increased participation, contribution, and growth – virtual worlds and interactive, three-dimensional experiences seem poised to redefine yet another way of digitally sharing experiences. Some real-world startups, such as Seriosity (www.seriosity.com), are investigating ways of translating real-world work into the fun and engaging “play” of virtual worlds. Several publications have observed that large amounts of voluntary time are spent on the Internet doing tasks that normally would require monetary reimbursement in the real world (Galbraith 1982; Nonaka 1994; Markus 2001). These include coordination activities, design and programming activities, composition of literary and visual works, and market testing of new products. Certain tasks on the Internet, particularly in virtual worlds, seem to tap into a sense of “play” among

participants, either in their structured design or surrounding environment (BusinessWeek 2006e 2006k).

For real-world organizations, if certain tasks can be translated into fun, interactive experiences, there exists the potential for individuals to perform the work voluntarily. Even if monetary rewards are still required, making work more fun might improve either the results or collaborative nature of the outcome (March 1991; Weick and Roberts 1993; Singh 2005). For organizations, including governments, where friction existing between different groups can preclude collaborations or interactions, virtual worlds might offer the opportunity to overcome these group barriers (Clippinger 1999; Cummings 2004).

Paying jobs are also appearing in the virtual work. Reuters already employs virtual journalists dedicated to reporting the news in Second Life. Advertisers and public relations experts are paid to generate buzz solely in virtual worlds. Several individuals are paid for short-term or part-time work in virtual worlds using virtual currency that can then be translated into real-world money, which again begs the question of whether these transactions should be taxed?

3.05 Liberalism, Libertarianism, and Citizenship in Virtual Worlds

Virtual worlds also pose challenges involving the intersection of virtual rights and laws with real-world rights and laws. If an individual in the People's Republic of China logs onto a virtual world hosted in the United States, to which country's rights and laws are they subject? Could an individual potentially request amnesty in a virtual world, or through a virtual world seek amnesty with a real-world government? Again, as of yet, no answers exist; no academic theories to even inform the answers exist.

Currently, virtual worlds are predominantly open-systems where anyone can join for free or for a reoccurring fee. No limitations usually exist, except for the age of some participants. For example, Second Life operates two worlds, one for individuals over age 18 and another for individuals under 18 years of age. Citizenship in virtual worlds exists as long as individuals pay any required fees and abide by the "code of conduct" and laws of the virtual world. Most virtual

worlds encourage individuals to join additional factions or interest groups within the virtual world, which may also have additional “codes of conduct” for their members (NY Times 2006a).

For the “adult” Second Life, there is no limitation on the type of consensual, virtual sexual activity among individuals, and several parts of the virtual world are quite explicit. Real-world devices have been produced that allow two or more individuals in a virtual world to feel shared, physical sensations in the real-world. These activities, plus the vast number of virtual “marriages” (some of which have also produced parallel real-world marriages), beg the question of what does it mean to interact intimately with a virtual avatar?

Aside from a baseline “code of conduct,” most virtual worlds generally are lawless at the moment, representing an extreme form of libertarianism (Dawes et al. 1986; Orbell and Dawes 1991). The participants in virtual worlds are generally open-minded to begin with, given their early adoption of the technology, so a pervasive spirit of liberalism exists in most virtual worlds as well. Virtual avatars can be any gender, shape, size, or species that the individuals creating them want them to be. In no way must the avatars represent their real-world counterparts. For real-world academics wanting to do experiments in virtual worlds, this is something of a problem, as the behaviors or opinions elicited in a virtual world may not represent anything other than one of many alter-egos belonging to an unknown real-world individual. However, real-world marketing researchers hope to be able to glean information on individual preferences (such as risk-taking behaviors or likes and dislikes) by involving virtual world participants in games and activities designed to elicit such insights indirectly. In addition, Linden Lab recently announced in April 2007 plans to link some form of real-world identity measure with avatars, primarily for legal protections. It remains to be seen whether these identities will be publicly available outside of Linden Lab’s own knowledge (BusinessWeek 2006e; Wired News 2006a).

3.06 Who Really Is In Control, Real-World Organizations or Virtual Citizens?

So who decides what laws are appropriate for the virtual world? Since most virtual worlds are operated by a single real-world firm, to date the answer has been the private, real-world firm hosting the virtual world. Second Life provided a unique example where a “revolution” helped

influence Linden Lab to change its direction with regard to property rights and taxes, ultimately resulting in growth of the community from 15,000 to 6,200,000 participants. Lawrence Lessig was the academic who encouraged Linden Lab to listen to the virtual community's requests. Lessig also is the author of both "Code" and "Code 2.0," two books highlighting the importance of a free, open, and relatively unregulated Internet. His writings include arguments that the Internet community will manage to organize and control itself, within specific oversight. Further, any specific oversight, in Lessig's view, will be influenced by corporate or real-world political concerns, and in the long-run would adversely reshape the Internet into a more limited technology (Wired News 2006b).

For virtual worlds, the same questions can be asked: who should be in control? Dotsoul.com and other open-source efforts provide intriguing virtual worlds attempting to empower the virtual participants themselves to help define property rights and rules. Other virtual worlds clearly are focused on corporate ownership and profit. Free and unregulated virtual worlds can be problematic, as the chief virtue of Second Life is also its most glaring flaw: everyone is free to create anything they like, which can result in ugly sprawl and ugly developments. A potential parallel "Tragedy of the Commons" could arise in virtual worlds (Ostrom 2002; BusinessWeek 2006b).

Yet recent activities have shown a maturing in virtual worlds, as virtual designers like Anshe Chung and Aimee Weber begin to realize that their virtual customers want some order and regulation. Real-world corporations are asking Second Life to consider more regulation to ensure the stability of the Linden dollar before they invest further in a virtual world. It could be that a combination of virtual citizens and businesses in virtual worlds may endogenously produce additional laws and social institutions designed to stabilize virtual worlds.

It could also be that virtual citizens and real-world businesses begin to take offense at each other. Radical, anti-corporate activism has begun to appear in virtual worlds, to include the Second Life Liberation Army (SLLA, slla.blogspot.com) which claims to be a "national liberation movement working towards establishing citizens' rights within Second Life." Concerned that big businesses increasingly will take over the direction and focus of Second Life, the SLLA has performed acts

of vandalism in the virtual world on corporate storefronts, such as American Apparel and Reebok, in an effort to promote its cause. The SLLA has petitioned Linden Lab, the private firm that operates Second Life, with a demand for individual participants to each receive real-world stock in the company. The radical activists have also posted bounties between L\$500-L\$1,000 for any virtual avatar recording attacks on specific corporate targets. Real-world journalists have also had opportunities to be embedded with and interview members of the SLLA virtually (BusinessWeek 2006m).

If a mass exodus of virtual individuals occurs in any virtual world, the company hosting the virtual world will suffer. It is in the best interest of Linden Lab to keep a majority of its virtual citizens happy – so the question remains unanswered, who really is in control in virtual worlds?

3.07 Within or Transcending Nations, Will Real-World Boundaries Still Matter?

Virtual worlds provide tricky jurisdictional questions: “where” are they? Which legal system applies? If a business wanted to press charges against an individual or group in Second Life, would the legal charges fall under the U.S. legal system (since that is the location of Linden Lab, hosting the world)? When the “copybot” incident allowed malicious individuals to make copies of all virtual items belonging to other virtual participants, Linden Lab publicly said it would not resort to virtual world “law enforcement” of such malicious activity, but rather would refer any complaints to real-world law enforcement under the U.S. Digital Millennium Copyright Act (DMCA). If the malicious individuals existed in a country outside of the U.S., could they realistically be charged and brought to court for an offense in a virtual world (Dawes et al. 1986; Ostrom 2002)?

The involvement of the U.S. Department of Homeland Security in Second Life also begs a few interesting questions. If an aberrant activity is detected, do they have any authority to stop an individual in a virtual world? Presumably they would defer to Linden Lab to identify and remove a virtual avatar, though such questions have (as of yet) been unanswered. If terrorist groups began to distribute propaganda in Second Life, would the U.S. government intervene? How much free speech is allowed in virtual worlds?

Of note, Second Life will soon release a Chinese-language version of its software client, which begs the question as to how much free speech will be allowed in a Chinese version of Second life? The influence of Chinese politics over previous Internet technologies is worth considering, as users of the Chinese version of Google (www.google.cn) may receive dramatically different search results than users of the U.S. version (www.google.com). The search for “Tiananmen Square” on the U.S. version reveals historical articles discussing the 1989 uprising by students and subsequent massacre; whereas the same search on the Chinese version results in travel guide and photos of tourists visiting Tianamen Square, absent of any historical discussion of an uprising. Thus, will the Chinese version of Second Life include similar government-encouraged censorship on behalf of Linden Lab in Second Life?

Fast-forwarding another 10 years, with the continued adoption and growth of multiple virtual worlds, and a serious research question can be posed: do virtual worlds exist within or do they transcend national boundaries? Noting an existing trend for global off-shoring of work, 10 years from now individuals may work and play increasingly with individuals who transcend their immediate local environment. As of 2006, this is already the case for thousands of individuals. By 2016, this could be the case for millions of individuals who begin to identify their citizenship not with their real-world location, but with the companies they work for electronically, through computer-mediated experiences, and the friends they play with through virtual worlds (NY Times 2006a; Wired News 2006a).

As virtual worlds grow, will they present social forces that challenge the dominant power of national governments? Could individuals even begin to have multiple citizenships, with both a real-world nation and several virtual worlds of their own, elective choice?

4 Conclusions

The reality of virtual worlds which allow everyone to create a digital character and interact with other computer-generated individuals, landscapes, and virtually-run businesses is here. Both endogenously produced economies and social orders are emerging in these virtual worlds.

Researchers, several intriguing questions can inform both existing theory and generate wholly new theories with regard to business, information, and political systems in virtual worlds (Gregor 2006). For the most part, any conclusive answer to questions regarding the nature and overlap of real worlds with virtual worlds remain unanswered. Even theories to inform these questions and test hypotheses have yet to be developed, making the phenomena of virtual worlds worth investigating.

Researchers rarely have the opportunity to watch systems emerge endogenously with the potential to succeed or fail. Additionally, there are opportunities to advise and inform the rules afforded to a virtual world and observe their impact on the success (or failure) of a virtual world. With multiple virtual worlds emerging, friction between real-world vs. virtual laws and law enforcement is inevitable. Investigating the intersection of real world and virtual world phenomena should prove exciting. Research has shown that the generation of Millennials (those born after 1980) overwhelmingly believe in the ability of technology to enrich their lives. Most of the Millennials report no difference between friendships developed in the real world vs. friendships developed online, and most use the Internet to maintain their social network and plan social activities (BusinessWeek 2006j 2006k).

Curiously, when asked what items they would want to have if they had to be left on a deserted island, very few Millennials chose books. The number of books read for pleasure by Millennials is also quite low (less than two a year). It would appear that the Millennials are a generation shaped by interactive, social, non-textual experiences. Virtual worlds are exactly these types of experiences. For academic researchers interested in developments involving Internet technologies, instead of suggesting that one “stay tuned,” we would suggest they “log on” to a virtual world. Virtual avatars are building the future – complete with virtual businesses, economies, and institutions – online today.

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