

Cory Ondrejka

Collapsing Geography

Second Life, Innovation, and the Future of National Power

Innovations Case Narrative: Second Life

Geography constrains everything humans do. From our amazing abilities to navigate and model 3-dimensional space to the locations of multinational corporations' headquarters, physical and social evolution have been firmly shaped by geographic constraints. At the personal level, it impacts how we build memories, communicate, and collaborate. At the cultural level, geography defines how and where cities are built, impacts rates of technological development, and has been the cause for innumerable wars. Geography is an inescapable feature of all our lives.

Only in the most recent blink of human history have technologies arisen to combat the time, cost, and distance inherent to geography.¹ The telegraph and telephone provided the first communication links significantly faster than horse and ship. Radio, television, automobiles, and air travel further shrank the globe, changing where people lived and how families were structured. In the last decade, the Internet, World Wide Web, and cell phones have moved from geek gadgets to ubiquitous parts of everyday life.²

These transitions have helped create tremendous wealth and innovation, generating both hopes and fears that technology would truly change where and how people collaborate and build community. However, humanity has not profoundly changed. People still migrate to cities.³ Whole nations emigrate in search of work.⁴ While communication costs have dropped dramatically, the affordances of the telephone and Internet are sufficiently limited that innovation still generally happens in concentrated geographic areas.⁵

People are not yet free to experience the collapse of geography, to build communities, groups, and businesses independent of location. Where is the great transformation? When will remote collaboration and interaction improve to the point that the information economy⁶ will truly be upon us?

Virtual worlds will lead this transformation. The experience of developing and operating *Second Life* since 2000 demonstrates the impact of a virtual world to overcome distance and stimulate innovation and collaboration in software development,⁷ design,⁸ education,⁹ entrepreneurship,¹⁰ architecture,¹¹ philanthropy,¹²

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political organizing,¹³ and institutional development.¹⁴

Second Life has become a platform for collaboration and business that bypasses traditional geographic constraints, propelling several key shifts. First, *Second Life* demonstrates the power of using place within a communications medium, allowing distant participants to leverage real-world metaphors and habits to improve collaboration. Thus, participation no longer depends on a person being co-located

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ed with a project or other team members. The American Cancer Society supports their “Relay for Life” in *Second Life* and raised over \$120,000 in 2007.¹⁵ Teams were able to recruit participants from all over the world and bring them together for the relay within *Second Life*, something impossible in the real world.

Second, virtual worlds lower the cost of learning, a critical driver of innovation. Both amateur-to-amateur¹⁶ and professional training¹⁷ have flourished in *Second Life*. The

emergence of virtual worlds as places to acquire, share, and build knowledge dramatically impact the rate of innovation for all who use them.

A third shift involves the range of impact. Virtual worlds can change innovation everywhere. By creating a culture of experimentation, exploration, and collaboration, *Second Life* makes radically decentralized approaches, reduced costs, and collaboration across great geographic distance available to those with access. Instances of these powerfully transformative activities exist in both education¹⁸ and large corporations.¹⁹ As the Internet revolution has demonstrated, changing the substrate for innovation has the potential for greater impact than any localized change.

Finally, virtual worlds will change the alignment of labor markets and the

shapes of large organizations, including nation-states. Changing the substrate for innovation necessitates rethinking common ideas about what constitutes a working group. When less connected individuals can still work together effectively, new possibilities exist for more focused and efficient collaboration requiring lower time commitments than conventional jobs. When a person is able to join multiple organizations, each only requiring a few hours per month, labor markets will adapt to utilize this transformation.

If these new organizations are inherently multinational and decentralized, nations must reexamine their sources of, and claims to, national power.²⁰ Traditional models based on natural resources and population are no longer sufficient. Nations will have to focus on the value of innovation and recognize the need to leverage talent that could easily move elsewhere through outsourcing or freelancing. The continued rise in educational quality in high population countries like China means quantity will soon have a quality all its own. Simply relying on the brains within national borders will no longer be enough for nations hoping to compete in the global market. The 21st century nation-state must reach beyond its borders, blending the capabilities of a global talent base by redefining citizenship and what it means to be part of a nation. However, before discussing the collision of virtual worlds and citizenship, it is important to first understand the state of virtual worlds.

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HISTORY OF SECOND LIFE

Virtual worlds build on three broad areas of technology: the World Wide Web, massively multiplayer role-playing games, and avatar worlds.

The World Wide Web has demonstrated beyond a shadow of doubt the power and strength of radically decentralized systems and user-created content. For example, contributors to Wikipedia have created the largest repository of knowledge in history.²¹ The Web has changed the way people receive and discuss news,²² to the extent that their individual efforts are forcing longstanding news outlets to rethink their business models.²³ Unfortunately, the Web is generally asynchronous, lacks place, and is largely text based, limiting the forms of interaction available to

users and resulting in participation rates far lower than possible in virtual worlds.²⁴

Massively multiplayer role-playing games, while bearing the advantages and disadvantages of being games, brought millions of people online,²⁵ created a vocabulary to discuss interaction within simulated spaces, and generated surprisingly powerful and valuable markets. *World of Warcraft*, for example, has nearly 10 million players worldwide and millions of dollars of trade in secondary markets built around its content. Moreover, the complexity of large battles in *World of Warcraft*, where hundreds of players from around the world work together, demonstrates the importance of place and the potential to allow collaboration within shared, simulated places.²⁶

Finally, distributed avatar worlds created non-game digital places and situations. Avatars, a cartoonish, digital representative of the player, first appeared in *Lucasfilm's Habitat*. Later worlds broadened the representational styles available to the player, so avatar appearances began to vary from nearly photorealistic copies of the player to completely abstract forms. While often lacking enough activities to

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sustain audience attention, these were the first worlds that leveraged technology to create non-game spaces, thus escaping games' design shackles.²⁷

Second Life is a specific instance of a virtual world. For those not familiar with *Second Life*, imagine a space that looks a lot like the real world.²⁸ Well, a real world where you can fly. Running on an immense grid of computers, as of May 2007 *Second Life*

was simulating an area of the size of Singapore or Hamburg,²⁹ had 7 million registered users with more than 70% of them outside the United States, nearly 50,000 concurrent users, and a yearly GDP equivalent to US\$500 million. Due to the nature of *Second Life's* viral growth, all these values are continuing to rise exponentially.³⁰ When *Second Life* launched in June 2003, it simulated several square kilometers, there were less than 1000 registered users, and it had no measurable economy.

It is unique in several critical ways. First, the content within *Second Life* is built and owned by the residents who create it. Next, *Second Life* supports a rich and active market of those creations. And finally, *Second Life* is densely connected to the real world and the Web, through financial transactions, information flows, and organizations using *Second Life* to span the virtual and the real. These features exist in stark contrast to games which consistently exert intellectual property ownership over all of their content, attempt to block markets in content that residents have created, and discourage information and monetary connections to the real world

and the Web.³¹

Although now broadly accepted, it is important to remember that when *Second Life* began development, the idea that a virtual world could be interesting without game content, or could rely on user-generated content, was considered absurd.³² While some game developers were comfortable supporting the idea of user-created content, none of them were creating games that leveraged it at that time.³³ Even now, with the existence proof of *Second Life*, attempts to build on its concepts fail to engage communities in creation.

Second Life did not set the world on fire at launch. Over the first several months of public operation, *Second Life* saw modest growth. The team at Linden Lab was confident they were on to something but was worried about the lack of uptake. They convened a summit of experts in various fields to discuss why *Second Life* was not growing. Many smart people agreed to participate, but the key insight came from Stanford Law professor Laurence Lessig. Lessig pointed out something obvious in hindsight but not something the early employees of Linden Lab had considered. Specifically, he made the comment that it was a mistake to ask users to create a world but not allow them to own what they had made.

Lessig's simple comment, grounded in law and economics, led to a complete overhaul of *Second Life's* Terms of Service and, ultimately, to a revamping of the business model Linden Lab used. Suddenly, creators had entirely new opportunities. Empowered by ownership and the ecosystem that emerged, creation in *Second Life* exploded. By June 2007, tens of thousands of *Second Life* residents were profitable,³⁴ hundreds of thousands were spending money in-world, and the majority were experimenting with creation in a wide variety of forms, from customizing their avatars to building new businesses within *Second Life*.³⁵ A complete catalog of activities within *Second Life* is well beyond the scope of this article, but with more than US\$6 million a month in exchange between *Second Life's* internal economy and the real world, tremendous markets exist in fashion, music, architecture, education, training, and entertainment.³⁶ Residents from all over the world are taking advantage of the unique opportunities presented by the combination of incredibly low capital expenses to create a business, the safety and comfort of pseudonymity, and a growing, worldwide market. All of these factors will be discussed later in this article, but for now a key understanding is that *Second Life* is real. Real creation, real business, real communities all created by real people.

THE REALITY OF SPOONS

But how can activities within a virtual world be real? This is not the forum to get bogged down in a metaphysical debate, so instead the question should focus on what is meant by real. A piano created in *Second Life* is real in that it has value; the creator has intellectual property rights associated with its design, appearance, and script code that operates it; it looks real; it can have the physical properties of a real piano; and, could even enable someone to compose a piece on it. However, far more importantly, the connections and relationships formed during the creation,

sale, and subsequent playing of the piano are clearly real. In fact, much like the creation of a piano in the real world, it is quite likely multiple residents collaborated to create the piano, with specialists working on different pieces.

The interpersonal connections these collaborators share is real in the same sense as networks in the real world.³⁷ By embodying communication through human representations, or avatars, learning is situated in three-dimensional space and can positively impact trust,³⁸ social influence,³⁹ and collaboration.⁴⁰ Through physical, verbal, and visual interactions, these connections are created and maintained.⁴¹ The difference in *Second Life* is that this happens at a distance, enabling friends, groups, teams, and businesses to find the right people to interact with, no matter where in the world they live.

Of course, this requires virtual worlds to be broadly accessible. If only a tiny minority of Web users were able to master and enjoy the new technology, virtual worlds would remain a technologically feasible but largely irrelevant form of communication, relegated to the dustbin along with videophones. Fortunately, the evidence so far indicates users of *Second Life*, while still early adopters, come from a more gender-balanced, older, and multinational audience than would normally be expected of first users of new technology. Rather than young American males, *Second Life*'s community is nearly evenly divided between men and women, has a median age in the 30's, and most residents live outside of the United States.⁴²

That diverse audience has managed to engage in a staggering range of activities within *Second Life*. Hobbies turn into careers, play into education, and experiments into philanthropy. Consider Kasi Nafus, who joined *Second Life* in 2003 as Nephilaine Protagonist. By 2004, Kasi had turned her interest in art and design towards fashion and opened the first outlet for her "PixelDolls"-branded clothing. This small store turned into one of *Second Life*'s largest brands. Her experience was captured in a real-world documentary called "The Ideal World." Today, she mentors up-and-coming designers within *Second Life*⁴³ and is creating a new boutique approach to selling her designs.⁴⁴

Creativity proceeds at a pace shocking to the real world. Entrepreneurs speak of "*Second Life* time", the idea that everything is accelerated within the digital world. This should not come as a surprise. Creating and collaborating in a virtual world, with reduced learning costs, low friction micro-transactions, and no marginal cost of reproduction must generate impressive innovation and rates of change.

THE IMPORTANCE OF PLAY

Different forms of creation exist within *Second Life*. Like the real world or the Web, many residents play with creation, using the virtual world as a medium for communication and expression. Others attempt to monetize their play, exploring what it is like to be an entrepreneur, designer, manager, artist, musician, or consultant. Finally, some of those who build businesses are successful enough to turn their activities within *Second Life* into their profession.

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Traditionally, play and profession are considered quite separate, with the act of play lacking in economic generation or value on the one hand, and the nobility of profession on the other. This apparent dichotomy is a false one and only impedes the understanding of the capabilities at work within *Second Life* that allow for such incredible productivity and experimentation. The vilification of play is not a purely modern phenomenon.⁴⁵ As educators and anthropologists better understand the role of play in human learning and development, they are considering how critical play can be to exploring design space and reducing the risk associated with trying something new.⁴⁶ In virtual worlds the line between play and work is continuously blurred. When a resident of *Second Life* decides to explore clothing design and eventually converts that skill into real world income by taking her in-world earnings and trading them with other residents for US dollars, it is unclear what parts of the activity were play and what parts work.

DESIGN SPACE AND FLEXIBILITY

The safety that comes with mentally classifying an activity as play leads to a free exploration of design space. Nor is this experimentation is not undertaken alone. By creating a culture of shared creativity, *Second Life* allows residents to learn from the examples of others, to situate their goals and desires within the contexts created by others.⁴⁷

Learning from each other and the ease of collaboration illustrates the difference between *Second Life* and the Web: collaboration occurs in real-time and within a shared space. Consider Wikipedia and weblogs, the most common Web examples of peer production and collaboration. In both cases, although community creation and collaboration is more fluid than previously available,⁴⁸ it is still a sequential and asynchronous interaction. One person creates a post and after a macro amount of time other users are able to comment.

A similar, and illustrative, example is peer production in the open-source software development. Open-source development methodologies have proven effective at solving difficult software engineering problems via a distributed and agile workforce. Many different governance models have been tried in order to manage geographically distant developers, with significant variation in results. Misunderstandings and rivalries, compounded by distance and asynchronous communication, have hampered many open-source projects.⁴⁹

None of these examples leverage the place, embodiment, and simultaneous collaboration at the core of interactions within virtual worlds. Place grants both context and organization to conversations, helping an observer to immediately understand relationships between speakers and the topic being discussed. Avatars, the user's representation in a virtual world, embody the conversation, allowing real-world cues to flow into the virtual world.⁵⁰ Simultaneous collaboration allows multiple participants to interact in ways not commonly seen on the web, such as musicians in different cities playing a duet to an audience from all over the world. This real-time exchange is at the core of how content is created within *Second Life*.

Creation within *Second Life* is accomplished through the use of atomistic creation, an approach granting residents both great freedom to explore design space and an interface allowing multiple builders to create together, much as multiple construction workers collaborate simultaneously when building a home. In atomistic construction, simple geometric primitives are combined in a multitude of ways to build extremely complex creations and behaviors. This approach, in many ways equivalent to the “small pieces, loosely joined” philosophy of the Web, allows for creativity while still being simple to use. *Second Life* adds a powerful server-side scripting language and HTTP request on top of rigid-body dynamics to give creators the maximum possible design space. For those who have not experienced building within *Second Life*, an example is useful. Consider building a piano in the massively multiplayer online role-playing game (MMORPG) *Ultima Online* versus in *Second Life*.

In *Ultima Online*, a user can purchase a large number of objects, ranging from checkerboards to cloaks. With careful stacking and a lot of patience, it is possible to create something that looks like a piano.⁵¹ Of course, it is not really a piano and the user could not use it to compose music. It is purely decorative.

In *Second Life*, the resident would start building the piano in real time, creating primitives as needed. These primitives would be scaled, textured, colored, and combined to create the piano. Sound could be added to the keys, so it could be played. A symphony could be composed on it. Rather than simple decoration, this *is* a piano. If the builder needed help, she could reach out to other members of the *Second Life* community for resources, including building tutorials, models, textures, audio samples, and help with the scripting.

Of course, since these are primitives, the piano could also fly or follow the resident around like a pet. Copies of the piano could be given away or sold with practically no marginal cost of reproduction. When the piano was no longer needed, it could be removed from the world and stored for later use.

By endowing every primitive in the world with physical and behavioral properties, primitives become the basic building blocks of everything from hats to houses, cats to cars. Rather than the real world’s hundred different atoms with limitations on how they can be combined, *Second Life* is made up of several simple primitive types with the flexibility to generate a limitless set of possibilities.

Compare this to content creation for games, where creating three-dimensional, interactive content is the driving force in the skyrocketing cost of video game creation.⁵² Despite the emergence of many different game engines and intense competition in the middleware space, in excess of half of the total cost of game development is content creation and the proportion is continuing to increase.⁵³ Thus, even if the cost of technology development approaches zero—an unrealistic assumption, given how regularly engine technology has to be customized for particular applications—middleware will only result in a 30–50% reduction in development cost, a result that seems impressive until viewed in the context of exponentially rising development budgets. Also, content creation has traditionally been the domain of elite artists, and despite readily available and inexpensive tools to create

three-dimensional art, few web users ever try them.

Instead, consider the items, such as houses, airplanes, clothing, and hair, being created by the millions in *Second Life*. Through the use of atomistic creation, individuals and communities within *Second Life* are generating content at a prodigious rate. As of June 2007, residents were adding over 300 gigabytes of data to the world every day, one million distinct items had been bought or sold in the preceding month, and tens of millions of scripts were running at all times within the *Second Life* grid.⁵⁴ This output is remarkable given the difficulty of mastering these tasks.

COMMUNITIES OF CREATORS

The creation of high quality, 3D elements, characters, and code is the domain of specialists and not amateurs. Yet most *Second Life* residents at least experiment with the built-in tools to create objects, characters, and code. Several factors contribute to the high participation rates and encourage residents to invest time and effort in mastering *Second Life*. *Second Life* reaches a wide audience, despite requiring a modern computer, three-dimensional graphics card, and a broadband connection. *Second Life* residents are about as likely to be women as men. While more men sign up for *Second Life*, women spend significantly more time logged in. *Second Life*'s users are also somewhat older than gamers in general. With millions of people, its community is large and growing but is still a tiny fraction of the 1.1 billion⁵⁵ people who use the web worldwide.

This community is also very creative. While websites based on user-created content are becoming increasingly popular, a relatively small percentage of Web users actually create content. Despite the explosion of Weblogs, fewer than 10% of Web users have created a blog.⁵⁶ Even Wikipedia, with complete dependence on its community for content, receives contributions from less than 5% of its readers.⁵⁷ In comparison, over 50% of *Second Life* users experiment with making content in any given month. Amazingly, over 15% write script code, despite the complexities and difficulties of mastering *Second Life*'s C-like scripting language.⁵⁸

Second Life residents are willing and able to create because they have ownership over their creations, as Lessig predicted. The dramatic acceleration in the growth of *Second Life* around the change in intellectual property certainly supports Lessig's assertion. However, retaining intellectual property was only the first step. The second was change to *Second Life*'s business model. This shift away from a conventional subscription service to a variable pricing model allowed residents to forward invest and experiment with different businesses. In the original economic system built into *Second Life*, a complicated series of taxes and stipends provided limits on resource allocations within *Second Life*. Specifically, the system attempted to control how many primitives a particular user could create. Of course, universal approaches tend to be susceptible to local variances, and this system was no exception. Even at the relatively modest usage levels achieved six months after launch, the system was having severe performance problems as successful users were able to flood parts of the world with their creations. Worse, creators and

entrepreneurs had no straightforward way to invest in business ideas, communities, or pet projects. As such, few large projects appeared in the world.

In January 2004, *Second Life* eliminated the taxes and stipends and instead tied primitive densities to server computers, using land as the visible proxy for computing resources. This opened up new opportunities for creators. Rather than having to acquire sufficient Linden Dollars in *Second Life* to explore large creations, they could instead accomplish that through the purchase of extra CPU resources.

The explosion of creativity and entrepreneurship following the business model change points out how willing people are to experiment with new roles, entrepreneurship, and business ideas when the risks are small. As soon as tens or hundreds of U.S. dollars were sufficient to start a business in *Second Life*, thousands of people began to try.⁵⁹ Compare this to the real world, where a primary source of funding for small businesses is a second mortgage.⁶⁰ A second mortgage can be a significant risk for the entrepreneur and her family. Moreover, not everyone owns a home or lives in a country where owning a home is common.⁶¹

Compounding the risk, many cultures disproportionately stigmatize failure, reducing both the chances an entrepreneur will take and the opportunity to learn from past failures.⁶² Within the virtual world, reputational costs are orders of magnitude lower. Residents in *Second Life* may choose to leverage the pseudonymity inherent to virtual worlds, allowing them to experiment without the fear of sullying their real-world reputation. These factors combine to radically change the risk profile of being an entrepreneur.

Finally, the learning required to create something new has its costs and hurdles. In the real world, learning about design, innovation, or entrepreneurship can be a difficult or expensive task. Again, the virtual world is different. Businesses and creation happen in-world, in plain view of the communities surrounding them. So, rather than aspiring creators learning in a vacuum, they are able to understand the benefits that could come from mastering new and complex skills. Even better for the potential entrepreneur, opportunities to learn directly from creators and businesses abound in *Second Life*. From the many in-world business classes to the opportunity to observe and collaborate with other creators, *Second Life* places opportunities within a culture that embraces and rewards creativity. Other than the very best real-world technology clusters, it is difficult to conceive of an environment more supportive of experimentation and exploration. These factors combine to make *Second Life* an inexpensive place to learn.

This is critical, for the cost of learning constrains the rate of innovation.⁶³ The cost of learning is a somewhat poorly defined concept, but it encompasses the costs related to risk; the costs of communication, especially those related to distance; the costs of bridging disparate processes, communities, professions, lingo, and language; and, the costs associated with building, maintaining, and monitoring trust.

This connection between the cost of learning and the rate of innovation is often unacknowledged or misunderstood. A large reason for this lack of understanding is the set of common errors about the nature of innovation Scott Berkun investigates in the “The Myths of Innovation,”⁶⁴ including the myths of epiphanies,

a method for innovation, lack of good ideas, and the lone inventor. Taken together, these myths hide the reality of innovation as a largely random exploration of design space, a process where breadth of experimentation and communication between entrepreneurs drive the overall success rate.

Innovators using *Second Life* have significant advantages in these areas. Virtual worlds help to create a long tail of innovation, allow safer opportunities to fail, provide better tools for building trust, create structures that can connect ideas, and enable looser social and community connections to still generate productive outcomes. The next five sections will focus on each of these in more detail.

THE LONG TAIL OF INNOVATION

By now, most are familiar with Chris Anderson's concept of "The Long Tail."⁶⁵ For those who are not, it is the idea commerce generally occurs by selling the most popular items. In virtually all markets, popularity falls along a power law distribution. A few, successful items are orders of magnitude more popular than the vast majority of less in-demand items. This is compounded by the emergence of dominant, big-box retail outlets that are only able to stock a relatively small number of CDs, books, or DVDs. Anderson's insight was to realize the rest of the content created in a market might be as—or even more—valuable in aggregate than the smaller number of high value items, if only search and distribution costs were kept low enough to allow producers and consumers to find each other. This is the Long Tail, the idea behind new methods of sales and distribution, such as Amazon's book sales or Rhapsody's streaming music service. These methods allow the majority of content ignored by traditional retail outlets to be profitably sold. Even more importantly, the Long Tail of less popular content also generates a more diverse and interested customer base.

This same power law distribution is a suitable approximation for other aspects of innovation and collaboration, beyond the Long Tail of consumption Anderson describes. Consider the potential entrepreneur: how many factors act to prevent someone from even attempting to build a business? Remember, this is not just the investment of dollars, but also includes time, social risk, and other elements. Even a basic requirement for a lawyer or license is a substantial hurdle.⁶⁶

In cultures or nations that generate many of these impediments, only a few entrepreneurs even try.⁶⁷ While they may be the best funded, most determined, or most risk-tolerant entrepreneurs, innovation—as a random walk through design space—is dampened by significant reductions in participants. Inventory and shelf-space pressures will tend to constrain a market to the top of the power law, reducing the variety and ignoring a lucrative customer base. In the same way, regulatory, legal, or social pressures also prevent entrepreneurial activities.⁶⁸

There is an additional parallel to the Long Tail, namely the myth of the expert innovator. In a hit-driven market limited by shelf space, it is natural to bias towards sequels and superstars, both of which generate immediate name recognition and maximize the chances of sale. Of course, when those pressures are removed cus-

tomers will consume a far broader set of content, leveraging collaborative filtering and recommendation schemes. Consumers will be less reliant on what is popular. For innovation, there is a similar, simplistic urge to “hire the innovators,” an ineffective strategy at best.⁶⁹ Systems and scaffolding need to be put in place to allow breadth of exploration, experimentation, and failure.

FAILURE IS NOT AN OPTION... IT IS A REQUIREMENT

Entrepreneurs fail early and fail often. Any study of successful inventions or businesses describes the missteps along the way to success.⁷⁰ Whether a creator is able to recover and learn from these mistakes is the critical question. There are costs related to risk and failure, but virtual worlds provide several methods of reducing them.

Two have already been discussed: pseudonymity and the need for vastly less investment capital than in the real world. For both of these, less activation energy is required to cross the chasm from idea to execution. When inspiration strikes within a virtual world, all the necessary tools are available for immediate exploration. No factories need be built, no inventory chain created. Instead, ideas are able to flow directly into practice.

Of course, many of those ideas will not succeed. That is OK! Attempts at innovation will be full of dead ends, missteps, and bad ideas. Unfortunately, innovation is generally not spoken about as a random walk. Instead, focus shifts to innovation being tied to people, spending money, or some shortage of ideas.⁷¹

The important issue is why framing innovation within those myths is so tempting. Selection bias guarantees the focus lands on the apocryphal “eureka!” moments and post-hoc Genesis stories. Complex and messy realities have always been reduced into easily understood sound bites.

The act of innovation is always messier. Rather than the simplicity of the lone inventor, innovation emerges at the intersections between social networks, where new ideas can collide and blend.⁷² These networks contain knowledge and expertise from different fields, so the more cross-pollination technology enables, the more innovation is possible.⁷³

Second Life, because of its simultaneous use model, helps to create these settings for cross-pollination. As individuals discover that *Second Life* makes their lives better, they ask their friends to join them. However, once in *Second Life*, residents have many opportunities to interact and collaborate with others from anywhere in the real world. As a result, social connections in *Second Life* are inherently cross cultural and interdisciplinary, and increase the marginal value of additional connections. Knowledge collisions, so critical to innovation, happen constantly within *Second Life*.

The next challenge is one of execution. In the real world, most projects require the input and coordination of many people as well as significant resources.⁷⁴ As previously discussed, *Second Life* reduces the resource costs associated with exper-

imentation and, when collaboration is required, more connections are accessible than ever before.

NON-GEOGRAPHIC COLLABORATION

Trust is a key component to maintaining these connections.⁷⁵ Human social interactions are the culmination of millions of years of evolution and are incredibly focused on building connections. Unfortunately, when place and human embodiment are removed by audio or text-only communication channels, it becomes more difficult to establish and maintain trust.⁷⁶

Many approaches to building trust have been attempted, with some success found in three specific ways. First, by aggregating numerous transactions. Second, by sufficiently reducing risk from transactions to allow commerce to continue despite reduced levels of trust. Third, by leveraging the power of social networks and allowing a meritocracy to emerge.

eBay provides the canonical example of the first quantitative trust index, with a well-developed and tested reputation system. Despite some defection

opportunities, eBay's reputation system operates well enough to serve as the backbone of trust for billions of dollars worth of auctions. Both buyers and sellers on eBay place tremendous value in the reputation system and will invest time and money on mediation and dispute resolution when negative ratings are given.⁷⁷

Online commerce, with the decision by major credit card companies to absorb the liability of most online transactions, demonstrates the strength of the second approach to reducing risk.⁷⁸ It is a powerful realization that if an online transaction results in an unsatisfactory experience that the risk falls on the credit card company or seller rather than the consumer. Suddenly, a surprisingly small amount of trust is required to engage in a transaction, and online commerce has flourished as a direct result.

Another means of reducing risk transferred from the real world is to create social networks, such as Facebook, connecting friends and friends of friends. These

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networks are still exploring the ultimate value of sharing reputations through friends.⁷⁹ For readers who have not explored these sites, friend-of-a-friend networks leverage the concept that a friend's trust can be used to indicate some level of trust in a stranger. Specifically, if Tom and Sandy are both trusted by Mark, Tom and Sandy might be expected to have some trust of each other. Of course, this works in the real world when networking or meeting new people, so it should come as no surprise that similar networks are being created online.

Finally, many open-source projects serve as powerful examples of the strength of participation and meritocracies.⁸⁰ When members of a community are actively contributing to the success of the project, and their contributions are measurable in concrete ways, trust in the knowledge and expertise of various community members builds rapidly. Often this expertise is codified in community structures, governance, or hierarchy, making it easier for new members to know whom to trust on specific issues.

What is so exciting about virtual worlds is that they can leverage all of these approaches and combine them with the power of avatars.⁸¹ People are more likely to trust interactions with avatars⁸² than less embodied forms.⁸³ This is an important idea, for it means that systems emerging within virtual worlds can generate more influence between members than similar systems created on the web.⁸⁴ An outcome of this trust advantage can be seen in early research around changing opinions through virtual collaboration.⁸⁵ In particular, evidence suggests that opinion change between collaborating avatars mimics opinion change seen in real-world exchange programs.⁸⁶

In June 2007, Linden Lab was approaching 200 employees, scattered between 3 major offices, 3 smaller satellite offices, and dozens of independent employees working from home. Already an organizational challenge, the need to reduce the impact of geography on Linden Lab's employees was even greater because Linden Lab does not geographically constrain projects. Rather than having one office focus on the client software while another did marketing, all projects at Linden Lab attempted to optimize for the best participants from within the organization. As a result, software development teams often found themselves operating with changing team members in different cities and continents. Moreover, unlike completely decentralized organizations, some team members for a given project would be in the same office, while others would be scattered.

Second Life was consistently part of the solution to these communication and organizational challenges. Combined with collaborative text editors,⁸⁷ *Second Life*, with its embedded voice-over-IP capabilities, has proven to be an excellent tool in building and maintaining cultures within teams. Most Linden Lab employees manage to meet in the real world as well, but for employees in different offices, *Second Life* has become a regular tool for maintaining trust and connections between meetings.

This is a powerful idea, especially when considering the costs and risks associated with bringing geographically separated people together. Moreover, whether the ability to bridge distance is leveraged for public diplomacy, education, or busi-

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ness, this creation of trust and culture at a distance is an advantage over conventional outsourcing and communication technology.

OUTSOURCING 2.0

No group has leveraged distance collaboration as much as the *Second Life* developer community. For large projects undertaken within *Second Life*, attempting to directly build or gather resident resources is no longer optimal. Instead, external companies look to the *Second Life* developer community as a group of businesses capable of consulting, contracting, and educating around projects within *Second Life*. The developer community has become a significant employer. Taken together in June of 2007, the developer community is nearly 200 different companies with combined annual revenue in excess of \$60 million. The largest of the developers employ over 70 people.⁸⁸

More significant than size and scope is how these companies have been created. Nearly all of them have emerged from within *Second Life* itself, with residents within *Second Life* roleplaying as designers, architects, developers, program managers, or entrepreneurs.⁸⁹ Success and growth enabled them to move their businesses out into the real world, swapping the pseudonymity and low risk of the in-world economy for real-world contracts and incorporation.

Demand also drives the need for employees. Less than one year earlier, in November of 2006, the total aggregate employment of the developer community was only 600. By June of 2007, it was 3000.⁹⁰ This level of hiring growth would be difficult in any environment, but the specialized skills required for high-end creation in *Second Life* further reduces the available market for hiring and largely limits it to *Second Life* residents.

What may be a surprise is that most of the employees are hired directly from within *Second Life*. Rather than meeting in the real world, employees are hired after demonstrating their specific skills within *Second Life*. Much like open-source development, a meritocracy exists within the market of *Second Life* and companies within the developer community are able to leverage this knowledge. As might be expected from hiring directly within *Second Life*, with over 70% of its residents from outside the United States,⁹¹ most companies in the developer community built multinational workforces. Within the development community, as with Linden Lab, *Second Life* has become the primary method for the ongoing maintenance of connections within these organizations.

Stop and consider these facts for a moment. As a result of the demand to create content within *Second Life*, entrepreneurs have built hundreds of companies employing thousands of people from all over the world. The developer community tackles incredibly difficult tasks, including complex, community-based advertising;⁹² government,⁹³ non-profit,⁹⁴ foundation,⁹⁵ and education projects;⁹⁶ and, research and experimentation into collaboration in virtual worlds.⁹⁷ Creating these projects requires the developers to have expertise in design, collaboration, human-computer interface development, two- and three-dimensional art, software devel-

opment, web development, advertising, and branding. New projects are undertaken amidst fierce competitive and pricing pressure, and new developers are appearing regularly, ready to challenge the established leaders.

Thus, within the virtual world of *Second Life*, two distinct creative ecosystems have emerged, the individual creators and the professional developers. In both cases, there exist high degrees of participation and tremendous value creation. In both cases, complex and challenging tasks are mastered by an international and diverse set of users, many who learned these skills for the first time within *Second Life*. Developer community hiring has proved so successful, outside job sourcing firms have also begun to interview and hire from within *Second Life*.⁹⁸

Many countries in the real world are struggling with education crises and worries about innovation,⁹⁹ yet within *Second Life*, many individuals and groups are finding success in these endeavors. The cost of learning is one likely contributor to those successes. As this article has discussed, the cost of learning is somewhat ill defined, but whatever definition one latches on to, virtual worlds offer competitive advantages over the real world. From connectivity and trust to embodiment and elimination of distance, virtual worlds excel at bringing people together and sharing information.

IDEAS AND EXECUTION IN ORGANIZATIONS

Another contributing factor in reducing the cost of learning relates to the “shortage of ideas” myth. This myth fits nicely into the model of the lone inventor who struggles until the moment of creation. As the web based community of InnoCentive has demonstrated, the ideas exist. InnoCentive broadcasts difficult chemical and biological problems and allows scientists from around the world to participate as solvers. These outsiders achieved a nearly 30% solution rate of these previously unsolved problems.¹⁰⁰ Innovation is often simply a case of publicly asking the right questions.

The pseudonymity of virtual worlds makes it even easier to ask questions. This was demonstrated at Harvard’s “CyberOne” law class, where students were given the choice of attending class in the real or virtual world.¹⁰¹ When students began preferentially attending the virtual classroom, the professors surveyed them. They discovered even incredibly gifted students preferred asking questions in a virtual environment.¹⁰²

Asking question and connecting disparate groups are keys to how corporations innovate. Groups that are the most successful at generating new ideas rely on structures, individuals, and processes to help information flow between otherwise unrelated teams. This type of information flow, where smaller groups are allowed to experiment in partial isolation before cross-pollinating, maximizes the collisions of novel ideas and the opportunity to learn something new.¹⁰³ Unfortunately, partial isolation between groups negatively impacts the ability of the organization to successfully act on new ideas.¹⁰⁴ Execution in the real world requires tight coordination to efficiently manage manufacturing and production. Thus, in the real

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world, there is a tension between optimal organizational structures for innovation versus those for production, and every business is forced to make trade-offs in balancing them. In the virtual world, the far narrower distance between imagining and doing allows groups to optimize for idea generation.

One of the strengths of the Web is the incredible ability to turn ideas into creation. While participation rates are often lower than expected, they are exceptionally high when compared to any previous media form. Participation rates are also increasing as more children grow up immersed in the Web. For many Web users, having an idea and building it are basically the same thing. For residents of *Second Life*, similar opportunities exist: more people participate in creation; the design space available for creation is far larger than the Web; and, when a user needs additional resources, *Second Life* is itself an exceptional tool for collaboration and learning.

Also, like the Web, much of the activity within *Second Life* normally viewed as hard work is often described as play or fun. Even when intense learning or teaching is going on, the participants are entertained. Compare that to the normal challenges of getting learners motivated in the real world.¹⁰⁵ Thus, virtual world residents can optimize their groups for innovation and have fun while doing it. The businesses and groups they form go beyond distributed decision making and demonstrate how businesses and researchers can organize when they assume both innovation and production can be done at the edges, at the collision points, between networks.

Some examples already exist in the real world, where innovative approaches to manufacturing and production allow companies to act far more like information companies on the Web. Li and Fung, a huge clothing manufacturer in China, is an excellent example. But even Li and Fung is still strongly shaped by geography, from real-world meetings to the expensive transport of raw materials and finished products. Li and Fung will be more innovative when they take the next step and leverage virtual worlds to allow more cultural sharing and collaboration among their many partners. Imagine allowing the sharing and trust building demonstrated by Toyota-style management of suppliers to travel far greater distances, to make even distant suppliers very much a part of the same team.¹⁰⁶

DISTANT COMMUNITIES, LOOSELY JOINED

The decentralization of organizations is certainly not a new trend.¹⁰⁷ Falling communication costs have long changed how human communities form and businesses operate.¹⁰⁸ Virtual worlds provide the opportunity to both create and leverage larger and more diffuse communities than ever before. Toyota, for all of its successful management practices, often required suppliers to collocate with its automobile factories to maximize trust and collaboration. Virtual worlds, and through them the *Second Life* developer community, are building the same trust and innovation networks while ignoring geography.

Second Life's atomistic creation tools are the construction equivalent of the

Web philosophy of “small pieces, loosely joined.”¹⁰⁹ Similarly, these modern, loosely joined communities are the social equivalent. Small pieces are able to be more reliable and maintainable, while loose coupling allows rapid and innovative recombination in response to new challenges. Communities of creators in virtual worlds face few of the same frictions groups in the real world have to deal with when reconfiguring to change direction. Instead of having to change desks, offices, or cities, virtual teams simply change to whom they talking. As creators in *Second Life*, they already share a vocabulary and skill set that helps provide a common language for initial conversations, and the visible nature of creation helps establish expertise and *bona fides*.

These communities are all creating within a zero marginal cost environment, quite literally a post-scarcity economy. Although there are limits on the density of creation within *Second Life*, for the most part the only scarce resource is time, thus *Second Life* is a very pure example of an attention economy.

This is profoundly different from the real world, where scarcity acts as the underlying driver for most economic thinking. Moreover, economies of scale are changed in an attention economy. Rather than the mass production and inventory management so critical to real world scale,¹¹⁰ in the attention economy scale becomes an issue of mindshare, of time. How much productive time do people spend thinking about, working on, participating in a specific medium or project? Either a community or an experience is worth spending time in, or it is not. It is while considering that shift that the importance of innovation becomes more obvious.

THE NATION-STATE IN A POST-GEOGRAPHIC AGE

Nation-states have always been creatures of geography. As the peak structure of human organization, nation-states emerged from geography, self-identified through geography, and went to great lengths to maintain or expand their geographic presence.¹¹¹ Historically, this geography was tied to raw materials, access to ports, and lines of communication. With an increasing component of the world's markets and businesses bypassing geographic roots, nation-states must expand their approach to geography as well.

Ironically, there has been a dramatic acceleration in geographically focused nation-states in the last 20 years, even as the explosion of the Internet and the Web has dramatically reduced communication costs. Driven by spectacular collapses of larger nations and the rise of geographic—often presented as ethnic—nationalism, the 1990's alone saw the creation of over 30 nations. Unlike parallel business trends of the time, and contrary to economic alliances and soft power that was bringing many nations closer together, citizens were fighting for smaller, more geographically identified nations.¹¹²

This hyperfocus on geography should not surprise. As a species, humans emerged at the end of 2.5 billion years of adaptation to place and have had only about a century to absorb the impacts of light-speed communication. However, it

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is shocking to realize that even as technologies exist to take education and markets anywhere in the world, 13 million people in China are urbanizing every year.¹¹³ Building the equivalent of two New York Cities per year to support that migration is clearly unsustainable. Virtual worlds do not solve the problems of providing housing, food, water, and electricity to those people, but they could provide spaces for the kind of intellectual, cultural, and business centers normally confined to cities.

Knowledge and expertise are not localized phenomenon. Problems and solutions often exist in ignorance of each other. Nation-states have no hope of maximizing innovation if they isolate their people from each other or other nations. With the creation of the Web and the proliferation of cell phones, the only option for nation-states that wish to successfully control or limit information flows will be information isolation. Much like the doomed arm's race of digital rights management,¹¹⁴ attempts to partially restrict information will consume massive amounts of time, money, and effort. And they will fail.

Worse, censorship and digital rights management decrease innovation by increasing the cost of learning. They damage innovation and education, the two goals that should be at the center of any rational national policy.

With knowledge not a geographic commodity, power for the 21st century nation-state will be the rate of innovation.¹¹⁵ Innovation drives productivity growth and exponential increases in per-capita GDP, so nations with the highest rate of innovation will capture proportionally higher percentages of global GDP and trade. One need only look at the increasing disparity between the developed and developing worlds to see the importance of maximizing innovation.¹¹⁶

The equation to measure a nation's power potential also changes. In a network effects space, the addition of one person to the network has benefits in excess of that one person.¹¹⁷ Therefore, a nation's power will depend on the number of innovative and entrepreneurial people it harnesses. These people will drive exponential growth. Nations that build the largest networks of innovators will soon be very far ahead while those that lag will find themselves left in the last century.

A NEW MODEL FOR CITIZENSHIP

Networked innovation and collaboration means quantity may have a quality all its own. As education systems around the world approach parity, nations will finally be able to maximize the skills and potential of their populations. Larger nations will benefit not from the natural resources buried in their soil, but the intellectual potential of their citizens. No nation-state will be able to compete counting only on the people within her borders. The most successful 21st century nations will be those that redefine what it means to be a citizen and build the largest networks of innovators.

The critical question becomes one of where innovation is going to occur, for innovation higher up the stack has broader impact.¹¹⁸ Consumer and product innovations impact consumer spending and create new products and services, but

business process innovation can change how an entire sector innovates. Government policy can change the design space available to business innovation resulting in even larger impacts.¹¹⁹ The decision to keep the Internet free and open¹²⁰ had a demonstrable impact on the overall rate of innovation across the United States and, ultimately, the globe. Many have argued that Finland's decision to provide a tremendous social safety net in terms of education and healthcare has helped to drive innovation in information technology and telecom.¹²¹

Networked innovation and collaboration means quantity may have a quality all its own. As education systems around the world approach parity, nations will finally be able to maximize the skills and potential of their populations... No nation-state will be able to compete counting only on the people within her borders. The most successful 21st century nations will be those that redefine what it means to be a citizen and build the largest networks of innovators.

Nowhere could innovation have more impact than changing the very nature of who can collaborate. By demolishing the national barriers to collaboration, a nation-state would position itself to maximize innovation and reap the benefits of a higher rate of innovation. This exponential growth in per-capita GDP will be the only way to stay competitive with other nation-states that adopt similarly open strategies.

When considering exponential growth, small differences today lead to dramatic differences in the future. Innovation drives productivity and per-capita GDP growth, and the cost of learning drives the rate of innovation. Ultimately innovation around the cost of learning will have the broadest possible impact on innovation as a whole.

The question then becomes how to attract and leverage additional entrepreneurs, since there will always be more great ideas and explorations than can be contained within any one country. Traditionally, citizens of a nation are tied to their host country geographically. For the rest of this article, this notion of citizenship will be dubbed "geographic citizenship" or "g-citizenship." Throughout the history of the modern nation-state, g-citizenship was bestowed via birth or naturalization. If you were born within the nation-state or the nation-state deemed you

valuable, you were granted g-citizenship. In exchange for taxes and participation in society, the nation-state provided varying degrees of physical and economic safety, such as representative government, military and police forces, a public education system, health care, and social security. Generally nations discourage citizenship in multiple nations and while travel, communication, and commerce freely flow between nations, the number of people who change g-citizenship during their lifetime is small.¹²²

More recently, in the age of cheap and easy travel, a second concept of citizenship has emerged, that of a national advisor or valuable visitor. To distinguish it from g-citizenship, this idea will be described as “honorary citizenship” or “h-citizenship.” In theory, this form attempts to bring new ideas and opportunities for collaboration into a nation. Various versions exist, from advisory boards to special Visas, but in all cases the goal is to cross-pollinate, reduce the cost of learning, and spur innovation.

Unfortunately, it seems unlikely h-citizenship will accomplish this. Certainly, outside experts and people of renown can bring attention and business to a country. Perhaps a single speech or several days of meetings can generate a few new ideas or inspire a local entrepreneur. Unfortunately, the time and costs required to physically transport senior advisors around the world ensure only a very small number of advisors will be asked to participate. This *a priori* determination of fitness is contrary to virtually everything understood about innovation, where broad approaches are needed. Worse, the nature of an advisory role only focuses brainpower on the nation-state’s interests for very short periods of time around specific visits or events. This is reminiscent of the “Eureka!” myth that innovation resides in brief moments of brilliance rather than deep, engaging collaboration.

But the real loss is that no matter how brilliant or valuable the strategic advisors are, there is the missed opportunity because the advisors rarely have time to work together. Rather than enabling a collection of great minds to collaborate, cross pollinate, and spend significant time on the problems facing a nation-state, advisory board meetings tend to be whirlwinds of speeches and posturing. It is only the rarest of events that are designed to build the kind of lasting connections so critical to collaboration and innovation. The problem, of course, is one of time. When hours or days of travel are required to bring h-citizens together, it is almost inconceivable that regular, impromptu, or ongoing meetings would occur. Fortunately, technology allows a radical reframing of the problem.

Consider a third type of citizenship, dubbed “virtual citizenship” or “v-citizenship.” Rather than building around a specific geography or event, v-citizens are tied to a nation-state by mind share and time. They meet and collaborate within virtual worlds, enabling them to ignore geographic limitations and focus instead on challenges and connections with other v-citizens. Rather than spending four days per year thinking about a particular nation, a v-citizen could spend one hour per week or five hours per month. More importantly, that time could be spent in virtual locations populated by other v- and g-citizens of the nation. Within *Second Life* numerous spaces have already been created in homage to specific countries¹²³

as well as for specific uses such as language immersion.¹²⁴ Consider if a nation-state built a place just for the use of its v-citizens.

Suddenly, instead of the ephemeral contact of an h-citizen, v-citizens are able to spend years building connections with the nation, using all the advantages of place and embodiment previously discussed. From the nation-state's perspective, v-citizenship creates a pool of entrepreneurs and innovators targeted to specific national goals and needs. Rather than having to pick and choose a small number of h-citizens, a nation-state builds a resource outside of its boundaries, a resource that could then be made available to institutions, local industry, or government. Even better for the nation, the v-citizens become ambassadors, a diverse population scattered around the world who are focused on another nation, building the kind of cross cultural awareness critical to both innovation and collaboration. In the 21st century, where an educated, entrepreneurial, and engaged population is the key to national power, connecting g-citizens with an active community of v-citizens becomes a critical national competitive advantage.

A question, however, is why this should be a form of citizenship at all. Don't individual corporations outsource all the time? It is a valid question and to answer it one must consider the implications of a fluid, worldwide labor market from the national perspective.

In a connected world, talented employees will always be able to follow the market, chasing the highest pay and best working conditions. However, switching always has costs, especially when it involves moving great distances. This is the great power of loyalty programs and communities. Small advantages are insufficient to trigger a switch if the current choice comes with frequent flier miles or a community worth staying connected to. V-citizenship could easily become a national loyalty program that pays huge dividends to the nations choosing to leverage it. Consider again the benefits of g-citizenship. While v-citizenship would be hard pressed to provide military protection, it could easily contribute to health care, retirement, or education costs. Especially for the kind of risk taking entrepreneur this program would hope to attract, even a mild social safety net could provide great benefits at very manageable costs. Moreover, by creating a community among the v-citizens and connecting them to g-citizens, v-citizenship would create the valuable knowledge collisions so prized by innovators. V-citizenship could even lead to more face-to-face contacts by copying existing programs that grant economically important visitors easier passage through customs, upgrades on national carriers, and other perquisites.

No matter the specifics, v-citizenship is a natural extension of the global information connections being built around the world. In a time of increasingly nationalistic and geographic biases, a nation-state embracing v-citizenship, making it easy for innovators and entrepreneurs around the world to collaborate with its g-citizens, would change innovation for all of its citizens and set a new bar for economic growth.

THE FUTURE IS NOT WAITING

Innovation is a slippery concept. It is rarely well defined yet broadly supported and funded. Well studied yet full of myths and misinformation. Its results are seen throughout national economies yet policies that actively diminish innovation are strongly backed. Innovation is also habitually tied to geography, with “Skunk Works” and special project teams inevitably pulled together into specific locations.

Virtual worlds, as demonstrated by the innovation and collaboration within *Second Life*, have the potential to reduce the impact of geography. Moreover, while they certainly do not offer the same affordances as communication in the real world, they do provide compelling improvements over other collaboration tools as well as specific capabilities, such as pseudonymity, that actually improve on the real world. And for innovation, like other phenomenon that create exponential growth, even small improvements will become dominant features over time.

Thus, for individuals, groups, businesses, and nations, the question becomes how to leverage these new places. Inherently interdisciplinary, cross cultural, and entrepreneurial, *Second Life* is following the Web as it is virally adopted by a diverse user-community around the world. Just as the Web was brought into businesses in a bottoms-up manner as employees found ways to make it useful, *Second Life* is being leveraged wherever it makes jobs easier or more fun.

This last element may be the most important. There are profound implications when the most capable and effective entrepreneurs are no longer describing their activities as work and instead describe it as play or fun. From the standpoint of innovation, given the importance of broad explorations of design space and the need to tolerate failure, turning entrepreneurship into play may change everything. This is especially true in a time when nations are actively compared on the basis of entrepreneurial activity.

Finally, it will be up to nations to decide how to leverage these new worlds. As many nations choose to isolate themselves from information rather than embrace challenging ideas, there is every chance that the 21st century will be one of haves and have-nots. Nations that leverage virtual worlds, with all their challenges and opportunities, will create dynamic communities that bypass geography to help them solve problems.

Those who choose isolation and ignorance, will not.

It is a simple choice and nations ought not waste time in deciding, for the curves are exponential and the economics unforgiving.

The future is not waiting.

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