

# Exploring Microsoft Future of Work Scenarios: Implications for Higher Education

By Daniel W. Rasmus

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*This article was originally published as a Microsoft-sponsored article in Innovate (<http://www.innovateonline.info/>) as: Rasmus, D. 2009. Exploring Microsoft Future of Work Scenarios: Implications for Higher Education. Innovate 5 (3). <http://www.innovateonline.info/index.php?view=article&id=656> (accessed January 19, 2009). The article is reprinted here with permission of the publisher, [The Fischler School of Education and Human Services](#) at [Nova Southeastern University](#)*

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## SYNOPSIS

In 2004, Microsoft undertook the task of exploring the future of work using scenario planning. In this article, the follow-up to “Scenario Planning and the Future of Education,” which appeared in the June/July 2008 issue of *Innovate*, Daniel W. Rasmus describes what education looks like in the four scenarios that emerged from this process. Rasmus suggests that educators and policy makers can use these scenarios and the accompanying narratives to consider how large and small choices work toward or against a particular future.

In [Scenario Planning and the Future of Education](#), published in the June/July 2008 issue of *Innovate*, I explored the process Microsoft Corporation used to create scenarios related to the future of work and how the company applied the technique of [wind tunneling](#) to explore how education might evolve in the different scenarios for the future of work. As I noted in that article, since at least one of the purposes of education is to prepare students for the world of work, the future of work will necessarily affect the future of education; economic and political forces will shape student and parent expectations and determine the resources available for education (Rasmus [2008](#)).

This article makes no claim to deep external scholarship around scenario planning; that work has been done elsewhere ([Exhibit 1](#)). Rather, in this article, I focus on the scenarios themselves, describing education in the context of the four scenarios that emerged from the future of work project and exploring how work and education may be linked in the various futures.

## THE SCENARIOS

The scenarios emerging from the process were based on a list of key uncertainties likely to shape the future ([Exhibit 2](#)). Two key uncertainties drive the Microsoft Future of Work scenarios: the strength of globalization and the organizing principle of the world as either hierarchical or networked. These represent high-level, external concepts that expand each other. For instance, a retreat from globalization combined with a networked organizing structure creates a devolved economic world where local groups maintain external relationships because they recognize the limits of local resources but are wary in those choices and suspicious until they build trust through personal relationships.

The scenarios that follow explore different ways in which the forces of market expansion and organizational principles may play against each other. Given that education is a critical uncertainty, the role of education

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and educational institutions is a factor in each future, with more traditional schools in the upper quadrants and more community-based education in the lower quadrants. In Frontier Friction the focus is on community while Freelance Planet's approach is holistic and global. The education scenarios were created by playing out additional uncertainties around education, identified in further research, against the four scenarios for the future of work.

To gather further insight and create a student perspective on the scenarios, Microsoft hosted 12 students from Eton College (King's College of Our Lady of Eton beside Windsor) in March of 2007. The students were presented with the Future of Work scenarios and then broke into teams to explore individual scenarios. Each team was given a series of questions about student life to consider ([Exhibit 3](#)). The teams were asked to speculate about the lives of students and their perceptions and attitudes within the confines of the given scenario. We used the answers provided by that exercise to create the various vignettes.

The result is a set of narratives that describe how education might evolve in the context of the various futures of work from the perspective of those students who participated in the exercise. The narratives focus on how education looks to students; a similar exercise with educators, administrators, or parents would yield different perspectives and different narrative details within the constraints of the particular scenarios.

The narratives are meant to be illustrative of the types of exploration possible using persona-building techniques; these are not definitive or conclusive analyses. They provide examples of how scenario planning can create a compelling alternative reality against which to challenge our assumptions about the future and can provide impetus for explorations of innovative products, processes, and partnerships that may help shape the futures described by the scenarios. Within the limited space of this article, I can offer only brief extracts of the scenario narratives; these snippets of narrative may evoke more questions than answers. Formulating answers to those questions within a given future's constraints will provide some understanding of the power that plausible alternative futures can provide for generating creative ideas or testing current assumptions.

### **SCENARIO 1: THE PROUD TOWER**

Proud Tower describes a future where merger and acquisition activities have led to large, centralized, vertically integrated corporations that have subsumed many of the functions of governments, including education and the development of local infrastructure ([Exhibit 4](#)). In this future, workers

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make their careers by climbing the corporate ladder, building relationships within their organization, and shaping their personal lives to the culture and priorities of their employers. Most workers are highly educated through strong, corporation-funded K-12 programs and corporate universities. In Proud Tower, what students learn is linked to what companies need; in effect, students are educated to become workers. Growing up with the knowledge that they are likely to be employed by the corporation that funds their education, students tend to take a much more vocational view of education:

Company staff meet with the students every day. A sign of routine. There is always some kind of free thing, either a product or a marketing gift. Bobby is planning on starting in marketing as soon as he graduates. The college is just a company bus ride away. The company encourages students to start early and build their careers while they learn. It seems to make sense. So much of the old college approach that he has read about was just pointless. Taking a bunch of classes to get well-rounded? If you know what you want, then why take Shakespeare or chemistry if you aren't going to use them? Nothing wrong with reading, but there is a lot of stuff to learn and the important thing, the productive thing, is to learn the right stuff really well.

As Bobby enters the classroom, he quickly sits down and logs in. Several company logos and the school's logo pop up as the computer starts. His school is a joint venture, but he knows where he is going to work. And the company knows it too. His classes are arranged to prepare him for a career in marketing pharmaceuticals. Prior to graduation, his scholarship and his job will be properly presented to Bobby and his parents. The scholarship investment will take him through a master's degree at the local university. It will be nearly impossible to refuse the offer and, with Bobby's ambitions, well outside the realm of probability.

Today's English lesson focuses on market messaging and the construction of messaging architectures. Bobby reads the assignment, which asks him to write a vision statement for the marketing plan, and starts typing.

## **SCENARIO 2: CONTINENTAL DRIFT**

Continental Drift envisions a retrenchment from globalization, perhaps caused by catastrophic economic conditions, an epidemic, or geopolitical tensions, creating a world of competitive nation-states or regional blocs.

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### *Proud Tower*

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Complicated relationships between various blocs and superpowers restricting access to manufacturing capabilities, raw materials, overseas markets, and immigrant labor ([Exhibit 5](#)). Workforce development and education are huge government priorities, especially in the context of labor shortages driven by demographic trends. Education in Continental Drift is controlled by isolationist governments that enforce a nationalistic world view. School is as much an indoctrination as an education, and even if students are not aware of this (younger students may have nothing to compare their education against), all students are attuned to the state's perspectives:

Another year, another new set of books. Ever since the Great Divide put a halt to globalization, it seems that history has become less historical. If history is written by the winners, where does truth come from when everybody just makes it through? Parts of Asia were starting to open up, but that was a few years ago. Mi uses many tools just like those of her Western competitors: computers, the Internet, cell phones. She is a member of several social networking sites, including Youth for Bangkok, into which she was automatically enrolled. Her use of the Internet and her personal associations are all, she knows, closely monitored, which means many of her thoughts and ideas stay within her mind, the one place no one can look.

School today is about history and language, music and athletics. Everybody is expected to be really good at something. Mi wants to be a writer, but there isn't much call for romantic poetry these days. Her phone rings to remind her it's time to start tutoring some of the younger kids on traditional music.

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### SCENARIO 3: FRONTIER FRICTION

Frontier Friction emerges following a severe shock to the global economic system, perhaps a data meltdown in the financial sector following a cyber-attack ([Exhibit 6](#)). With economic and educational infrastructure in disrepair, the quality of the knowledge workforce continues to degrade, requiring simpler tools and practical skills. In Frontier Friction, the world has become a much smaller place. With resources tight and mere survival still an important consideration, education has become simpler and more community focused and has returned to the basics. As a result, students, aware of the sacrifices made to get them in school, value education in itself:

Rachel's mother tells her that school is very important. They are lucky to have so many good teachers and access to the kind of material available here. She moved to this part of the country because she heard they still valued education. The community is a good one. They watch out for each other, and the level of violence is pretty light, comparatively speaking. They even have some computers up and running. People are starting to rethink the whole anti-computer thing, which is probably not too bad if you don't start depending on them for everything again.

In order to get Rachel into the school, Rebecca started volunteering as a playground supervisor and then as a part-time librarian. The school was self-funded and had bartered for much of their material a few years ago after a threat of disease caused another local community to relocate.

Rachel reads *Tom Sawyer* out loud; she is proud of the sound her voice makes against the makeshift school's ceiling. An old factory is a good place to be moving forward from, Mr. Hodgkins tells the students. He always tells Rachel that he likes her reading, and he picks her to read aloud often. Rachel writes down the key points of the passage from the whiteboard so she can remember the plot development and characters better. Rachel looks around the old factory and realizes, like Mr. Hodgkins, that a factory is a good place to be moving on from. We are making people learn again and what better place to make things than in a factory. Rachel can't wait for the next book. She hopes it's a mystery.

Mr. Hodgkins looks out at his class and finds solace that they are finally starting to care about something other than survival.

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#### *Frontier Friction*

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#### SCENARIO 4: FREELANCE PLANET

Freelance Planet is a world transformed by bottom-up networks and mass collaboration on a global scale ([Exhibit 7](#)). The flexibility and speed of networked systems renders centralized command-and-control hierarchies obsolete at all levels. Workers move from employer to employer, working on a project basis. They manage their own savings and healthcare or join one of the many guilds or associations that attract people seeking a sense of physical community in the ever-more-fluid and impersonal world of business. Students in Freelance Planet direct their own education, reaching out across national boundaries to explore their own interests and develop the relationships that will bring them work after they leave school. As a result, students tend to develop a fluid, personalized vision of education:

Sometimes Maria is late for school because she spends too much time learning. That may seem like an oxymoron, but it isn't, not anymore. Maria is up at 6:30 every morning and immediately starts scanning for the news of the day. The phone by her bed has been collecting news feeds all night. If there isn't anything big happening, she makes time for entertainment news. Sometimes not thinking is the best thinking you can do, she thinks.

Maria has no idea what she wants to be when she graduates; that's why she isn't limiting her options. So many choices, so little time. Modeling and biochemistry; Shakespeare and an outside class on practical home repair. One never knows these days. Maria's mom is a trained accountant but makes her money helping people invest money. "Better to make it than count it," she always says.

Today Maria will be learning biochemistry from a retired professor in England. He is very old-fashioned about England. The kids always laugh when he corrects references to GB or Europe. I live in England, he says. That may be true, but Maria knows that names are malleable as is time and space. It's easy to associate with anyone, anywhere, anytime. What Maria really wants to know today is about the chloroplasts they put into the mice in Dankook. She wants to know more from her learning colleagues in Korea about the skinny mice that don't need to eat.

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#### *Freelance Planet*

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## WHAT THE SCENARIOS MEAN FOR EDUCATORS

Reading over these brief sketches reveals the differences between the scenarios and the richness of the internal narrative and logic associated with each one. The level of detail runs from global, geopolitical forces to the individual worker and consumer. Although these scenarios were not focused on education, their application to education was fairly straightforward given the broad reach of the scenarios and the inclusion of education as one of the uncertainties. The characteristics of education find a home in the broader narrative as the relationship between work and education is shaped by larger forces.

While certain trends may be evident, none of these futures is, at this point, any more or less probable than any other. A scan of current publications will yield evidence to support movement toward any of them ([Exhibit 8](#)). Every day, our team “listens to the future” by mapping current events against the scenarios, attempting to illuminate patterns that reveal a directional bias in world events. Most of the time, the research reveals, especially early in the scenario process, that uncertainties are developing simultaneously in different directions and at different speeds. As the late evolutionary biologist, Stephen Jay Gould, says:

People are storytelling creatures. We like stories that go somewhere, and therefore we like trends—because trends are things that either get better or get worse, so we can either rejoice or lament. The point of my latest book, *Full House*, is to show that we mistakenly depict many things as trends moving in some direction. We take the “full house” of variation in a system and try to represent it as a single number, when in fact what we should be doing is studying the variation as it expands and contracts. If you look at the history of the variation in all its complexity, then you see there’s no trend. (Gould [1997](#), ¶10)

Thus, the direction, location, and pace of change all require diligent examination of the world around us so we can sense where change is occurring that is relevant to our business or our field.

Regardless of the directionality or pace of change, educators and education policy makers can influence these developments by making choices and creating policies mindfully with an eye toward what traits of any given future should be fostered and which avoided. The scenarios can help them generate ideas that might not be obvious if the social, economic, and political factors under consideration remained confined to those dominant in our present. Equally, ideas that look good in today’s

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context may unravel when examined against a differing set of assumptions. The education scenarios were created by wind tunneling education against the future of work narratives; in a similar fashion, policy decisions can be wind tunneled against scenarios with the goal of seeing how they impact current practice or perception. Using the scenarios, we can ask if policy choices or even day-to-day classroom decisions lead to the future that inspires or to the one that causes consternation. Does a particular policy or practice lead to a future of empowered learning or one that reinforces a particular ideology? Such exercises can be conducted by policy boards, at individual institutions, even by single educators. Scenarios can help ensure that outcomes are intentional rather than accidental, and that the future we experience is shaped by the best planning we can accomplish.

## CONCLUSION

The narratives that accompany the scenarios are meant to spark imagination and invoke a combination of logic and emotion, reason and intuition that can guide people and organizations as they make choices about their futures. These stories can help educational planners and policy makers, school administrators, and classroom educators examine the choices they make and provide a tool for better imagining the impact of those choices on students, institutions, and communities.

At the most practical level, scenarios exist to inform strategy; they should be incorporated into policy-level thinking to drive innovative thinking and to serve as signposts for policy outcomes. When applying scenarios, uncertainties should not be seen as independent variables. The interactions of the variables can create their own uncertainties. Demographics, for instance, often arrive in scenarios as a driving force, something that is known that does not change in the future. That is true here too, but the accounting for populations proves less important in the future of work and in education than does the interaction of generations and the kind of learning environments those interactions create.

Scenarios can be a passive intellectual exercise, but in that pursuit they lose their meaning too soon. They should be seen as living stories meant to challenge and entice, warn and test as the strategy forms and as it takes shape over time. Perhaps the most important application of the scenarios for educators comes from the reinforcing comfort that no predetermined future exists. In each moment, as the future unfolds, one that can transform passion and dedication into action that helps equip learners to lead, to engage, and to grow.

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## BIOGRAPHY

### **Daniel W. Rasmus**

Director of Business Insights  
Business Division, Microsoft

Daniel W. Rasmus guides the research process that helps Microsoft envision how people will work in the future, analyzing trends in technology, society, education, labor, and economics to devise scenarios used to develop products for tomorrow's work force. As part of these efforts, he represents Microsoft on the Board of the Directors for the Institute for Innovation and Information Productivity and serves as a national advisor to the National Workforce Center for Emerging Technology. Rasmus also coordinates the Microsoft Office Information Worker Board of the Future, an advisory panel composed of college-aged students who share ideas on how to serve the Millennial Generation as they join the workforce. Before joining Microsoft in 2003, Rasmus was an analyst with Forrester Research, Inc. His achievements included inventing conceptual frameworks for enabling the future of work, including adaptive workspaces and intelligent content services.

Rasmus is involved in a number of industry and public sector organizations, including The National Association of Workforce Boards, the National Educator's Workshop, and The Front End of Innovation. He was recognized as a Distinguished Speaker by the Microsoft Executive Briefing Center in 2007.

As a technology writer, Rasmus has worked on staff at *PC AI Magazine* and *Manufacturing Systems Magazine* and has been a columnist for several other publications. He has authored nearly 200 trade journal articles and four books, including *Listening to the Future*, which was published in 2008. His latest book, *Management by Design*, will be available from Wiley in 2009.

Rasmus attended the University of California at Santa Cruz and received a certificate in intelligent systems engineering from the University of California at Irvine.

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## EXHIBIT 1: RESOURCES ON SCENARIO PLANNING

A few key publications can provide an overview of the art, science, and application of the scenario planning process:

- Fahey, Liam, and Robert M. Randall, eds. 1998. *Learning from the Future*. New York: Wiley.

A collection of articles that offers several points of view on scenario planning.

- Schwartz, Peter. 1991. *The Art of the Long View: Planning for the Future in an Uncertain World*. New York: Doubleday.

One of the best process books on the market for the business reader. Current economic and technological events and realities render many of the examples archaic, but the process and the framework remain a valuable source.

- van der Heijden, Kees. 1996. *Scenarios — The Art of Strategic Conversation*. New York: Wiley.

One of the best books on the subject, bringing together scenarios with strategy. As a founder of GBN and a practitioner at Shell, van der Heijden is an insightful and original source on the topic.

## EXHIBIT 2: UNCERTAINTIES IN THE FUTURE OF WORK AND EDUCATION

The process for deriving uncertainties involves reading literature from a wide variety of sources, interviewing stakeholders inside of an organization, and gathering insights from thought leaders in industry and government. The research process generates a list—in the case of Microsoft, a list of well over 100 items—that engenders discussion among members of the scenario-planning team and is followed by a vote that reduces the list to key uncertainties that the team believes are most uncertain and most critical to the focal question—in this case, what will work look like in ten years?

The key uncertainties that the Microsoft team arrived at were:

Polarity A	Critical uncertainties	Polarity B
Segmented	Blend of work and home	Punctuated
Regional/local	Geopolitical and social world	Open/global
Irrelevant/subsistent	Education	Influential/leading
Rediscovered childhood	Multi-tasking	Old Younger
Highly protected	Intellectual property	Open
Component	Intellectual property	Document
Low adoption/human integration	Self-organizing technology	High adoption/adaptive systems
Search/reactive	Self-organizing technology	Context/proactive
More of the same?	What's after the Internet	Semantic Web
Emerging markets	Locus of innovation, wages, and capabilities	Western-centric
Reused and reapplication/nostalgia	Invention vs. reapplication	Innovation and invention/vision
65	Retirement age	Never
Ideological	Decision making	Pragmatic
Slow and managed	Pace of innovation and adoption	Rapid and fast
Distributed	Population and wealth	Concentrated
Networked	Organization form	Hierarchical
Antagonistic/disruptive	Popularity of the United States	Popular/influential
Traditional	Business models	Entrepreneurial
Balkanized	Connectivity	Pervasive
Local/personal	Data storage	Networked/personal
Specialized	Devices	Converged
Physical	Money	Digital (integrated metadata)

Each of the uncertainties reflected a number of questions and dimensions.

**The blend of work and home.** How much time do people spend at work? At home? Will there be a retreat toward a more rational, segmented view of work, or will people essentially work all of the time, punctuating their day with personal or work-related tasks and activities depending on moment-to-moment choices about priorities?

**Geopolitical and social world.** Is globalization inevitable? Could regional or local interests outweigh the growing integration of global economies? What could precipitate a retreat from globalization?

**Education.** Will education be more closely aligned with societal needs to nurture future citizens and future workers, or will there be an increasing disconnect between social needs and the education system so that education becomes less and less relevant over time? Will corporations be forced to take over education as a hedge against business discontinuity?

**Multitasking.** Will there be a call for active play and the use of the imagination for young people, or will increasingly sophisticated tools and technologies and greater access to mature content force children to get older younger?

**Intellectual property.** Will individuals, countries, and companies continue to drive the protection of their intellectual property, or will a more communal view of property emerge along with new standards of value? If intellectual property rights do continue to be strong, will protection remain at the container level or become more granular (document vs. sentence or word)?

**Self-organizing technology.** Will people continue to rely on increasingly sophisticated software to help organize data and make sense of the world, or will they use technology in a more collaborative way, with networks of trusted individuals augmenting algorithms with intuition? Will people accept software that anticipates their actions even if the software is wrong sometimes? In other words, will the efficiency of having software guessing about what its user wants outweigh the annoyance of it being wrong occasionally?

**What's after the Internet?** Will there be a new, disruptive medium that will make the Internet look as antiquated as the telephone? Are we looking at more of the same with continued constraint and commercialization of



the Internet, or will the semantic Web arrive and unleash new models of value?

**Locus of innovation, wages, and capabilities.** Will emerging economies overtake the United States, Western Europe, and Japan as the centers for innovation and wealth generation, or will the incumbents stay relevant and reap the benefits of their investments in competitive position and economic dominance?

**Invention vs. reapplication.** Will people tire of the new and become more satisfied with what works, seeking new applications of existing tools and technologies rather than clamoring for the latest tools, technologies, and fads?

**Retirement age.** Will people retire when they reach a conventional or mandatory age, or will older people, in need of money and healthcare to support full, healthy lives into their 80s and 90s, refuse to leave the work force, creating a pool of experienced but aging workers?

**Decision making.** Will rational, engaged, well-informed political leaders use science and learning to make decisions, recovering quickly from their mistakes by adjusting toward improved goals, or will the political world be more influenced by ideology and distrust of reason with individual beliefs and biases guiding decisions?

**Pace of innovation and adoption.** Will people rapidly acquire new technologies, concepts, goods, and services, or will they take a more leisurely approach to the adoption of new products and new ideas?

**Population and wealth.** Will the cities continue to be magnets for people and wealth, or will technology release people from geographical limits and let them enjoy the benefits of globalization from wherever they choose to work or live?

**Organization form.** Will the network organization of the Web overtake entrenched command-and-control hierarchies?

**Popularity of the United States.** Will the values of the United States be recovered in the eyes of the world with both political and social influences emanating from the US, or will the world increasingly see the American culture and political models as negative and disruptive in light of more balanced or more regionally selfish models offered by other nations?

**Business models.** Will traditional business models return as people attempt to fulfill more of their needs in local communities, or will the

entrepreneurial business models fueled by the Internet create even more novel models of commerce and service?

**Connectivity.** Will connectivity be truly pervasive with instant access and little or no authentication, or will networks continued to be balkanized by carriers so that connectivity will require individual contracts, available only in certain regions or limited by other boundaries? Data storage. Will data storage be moved to the Internet where individuals and organizations can easily access it from anywhere at any time, or will trust issues arise around access to data and how it is being used, driving a retreat to personal networks, devices, and storage media to ensure the security and privacy of data?

**Devices.** Will the small, multifunctional device arrive that will act as PC, phone, game device, camera, and media player, or will specialized functions reside in a plethora of computing devices, each with unique capabilities and independent connectivity profiles?

**Money.** Will money become information, for instance in the form of metadata that feeds loyalty and reward programs so that discounts and opportunities arise from how much information a person broadcasts during a transaction, or does money remain physical, being used as a means of control for businesses and nations in a future of suspicion, doubt, and distrust?

Part of the art of scenario planning involves the translation of these uncertainties into a matrix from which the various scenarios are generated.

### EXHIBIT 3: QUESTIONS FOR EDUCATION SCENARIOS

Questions used to generate the education narratives:

- What is the demographic profile of faculty and staff?
- How far do learners commute to attend school? Educators?
- Do students primarily attend public schools? Private? Charter?
- What do most students want out of education in this future?
- What subjects do learners like to study? What does the state or firm insist that they study?
- What subjects most challenge learners in this future?
- How do students discover personal relationships outside of the classroom? Educators?
- What kind of tools do students use to assist their learning? Educators?
- Do teachers model continuous learning in front of learners?
- Where do learners get their information?
- Do learners get all the information they need to learn effectively in school? If not, what is missing?
- Do learners get along with educators? If not, what gets in the way?
- Do learners work effectively with each other? If not, what gets in the way?
- What kind of clothes do learners wear?
- How closely is technology integrated into the life of learners?
- Are learners typically comfortable with technology? Do they adopt technology quickly or not? Do they view technology as an enabler or a hurdle? Do learners keep up with changes in technology? Do they like keeping up with technology?
- Where do learners store their data? Educators?
- What are learners' frustrations with school? Educators'?
- What do learners need to know to obtain a diploma or graduate? What do educators need to teach?
- How is a learner's progress and competency measured? An educator's?
- How do learners measure success? Educators? Administrators? Parents?
- How are learners rewarded? How do they want to be rewarded?
- What do learners do after school hours?
- What hobbies do learners enjoy?

- What do learners learn outside of the classroom that the school does not help them assimilate through formal learning?
- How are parents integrated into learning?
- Is the typical learner happy?

#### **EXHIBIT 4: PROUD TOWER**

In Proud Tower, corporate interests dominate, and corporations perform many of the functions once allotted to government. International laws favor large businesses and help to protect their intellectual property. Globalization creates a fertile climate for transnational commerce with economic opportunities leading to rapid development in emerging nations within the constraints of the oligarch investments. Many companies have created their own security and encryption capabilities because of a distrust of commercially available solutions. Because a few large companies dominate the market, it is difficult for small competitors to gain a foothold. Consequently, companies compete at the margins for market growth and revenue opportunities within their existing customer base while innovation suffers. Many global revenue models look more like annuities as products and services both offer support plans that roll out updates or replacements on a regular basis.

Some additional characteristics of this scenario include:

- Borders are increasingly fluid with global corporations as the primary organizing principle of commerce at every level.
- Security and intelligence needs tend to outweigh issues of privacy, and the U.S. military forms increasingly close relationships with global corporations.
- Corporations pay more attention to issues of governance, accountability, and sustainability, recovering some civic trust, but new global and social tensions are rising as people anticipate the century's third decade and as economic inequalities continue to widen.
- Highly proprietary, structured, corporate-monitored information systems and networks dominate the technology infrastructure. The Internet is primarily a means for connecting to work and a place to interact through corporation-sponsored and corporation-regulated sites.
- Intellectual property is controlled by corporations, some of which may deploy proprietary algorithms due to distrust of the companies that offer security solutions.

- Workers are (and must be) loyal to corporations. Whyte's (1956) "organization man," reincarnated as the politically correct "organization person" resurges, his conformist, approval-seeking impulses a good fit for this culture.
- The emphasis is on intraorganizational collaboration and communication as people use information and process expertise to gain status within corporate meritocracies. Internal networking and politics are more important than external relationships.
- Searching and filtering of internal information proves equally (or more) important than looking for external information as internal efficiencies and consistency drive corporate agendas.
- Organizationally oriented reputation systems help people figure out the best people inside the organization to work with to achieve their goals.
- Organizations worry constantly about information leaking out as they are obsessed by the need to maintain market image and preserve opacity around business process.

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## EXHIBIT 5: CONTINENTAL DRIFT

Continental Drift is the result of reinforced nationalisms emerging from complicated political relationships among the United States, Europe, China, and the Middle East. Political friction rivals that of the Cold War with security measures that make it difficult to do business across borders. As nations and regional blocs reassert self-protective nationalist ideologies, borders become less open, and access to key raw materials, information resources, markets, and labor becomes difficult. Although oil remains in adequate supply, the transportation of oil proves ever more risky with many nations choosing to reduce the length of supply chains and, in many cases, bringing goods production back to national soil. National governments become much more assertive in creating industrial and labor policies, reflecting a return to economic nationalism and disenchantment with the free market and neoliberal theories that dominated prior decades. The decline in trade increases the stagnation of the world economy and lowers the rate of wealth creation. A few large businesses thrive on government contracts and subsidies while competing among themselves for the domestic markets. Most businesses become increasingly associated with their nations of origin as they pull their edges in toward a more secure, controlled, and predictable core. Some nation-states nationalize industries, eliminating the subsidiaries of multinationals overnight.

Some additional characteristics of this scenario include:

- Increasing global problems — terrorism, economic turmoil, and environmental degradation — lead to the return of big government across the world.
- Although the United States remains militarily powerful, a series of strategic missteps significantly weakens its economic and cultural influence relative to rising powers elsewhere in the world.
- Major governments in Europe and Asia raise taxes to pay for large infrastructure projects intended to kick-start a stagnant and more regionalized world economy.
- Regional innovations do not spread globally; security barriers at national firewalls often halt the news of regional discoveries until they can be used to political advantage. This distrust causes much duplication of effort.
- A new generation of young nationalists, particularly in fast-growing economies like China and Brazil, spur increasingly confrontational military and economic policies on the part of their governments.

- Regional compliance becomes a significant source of overhead for the few remaining multinational companies as nations manufacture new forms of compliance to keep local businesses in line and deter international trade.
- Differences rule. New local competitors emerge in various regions as the disruption of the global economies creates local niches in industries once dominated by multinational firms and brands.
- Playing by local rules is as important as (or more important than) efficiency, causing many firms to reduce their profit expectations for business continuity goals. Multinational corporations retain control over international holdings through complex relationships that fragment internal operations to ensure compliance with local regulations.
- Cultural competence and multilingualism are valued skills among employees charged with negotiating the increasingly less penetrable boundaries between nations.
- Many nations create strict regulations on the movement of information and invest heavily in filtering and encryption technology to restrict access to national assets, leading to a high level of concern over information boundaries.
- As standards fragment and fracture, information translation and format transcription prove invaluable to maintain fluidity. Much early work done by hand will be automated over time.
- Regionally oriented reputation systems dominate with barriers to exclude finding expertise or managing relationships outside of approved boundaries.

## EXHIBIT 6: FRONTIER FRICTION

Frontier Friction emerges in the wake of a catastrophic attack on the networks that form the bedrock of our technology infrastructure. The far-reaching consequences of an attack on, for instance, the financial sector, causes people to lose confidence in the industries that have turned their money and their lives into the binary language of ones and zeros. A new awareness of the vulnerability of these systems generates a general pushback against technology. Over a very short period of time, confidence in the old order collapses and authority devolves to regional governments, communities, religious sects, and emergent and traditional clan and tribal affiliations. This is a problematic scenario for business. Companies must create and enforce their own security policies and operate in an environment of low trust among employees, customers, and partners. Supply chains are fragmentary if they exist at all, and much of the economy becomes localized with networks of communities interrelating at the near-local level.

Some additional characteristics of this scenario include:

- Power and influence seep away from hierarchical institutions and corporations as the old rules stop working and citizens tear down working institutions in favor of continuity.
- Facing a dynamic and dangerous world, people focus on communities and relationships to foster a sense of belonging; this gives rise to religious and ideological fundamentalism as well as new “swarm” models of communities that assemble and congregate based on current needs rather than long-term thinking.
- Privately funded nonprofits and nongovernmental agencies step in to fill many of the functions once performed by governments now starved of resources and crippled by corruption.
- The distrust of centralized political or social entities heightens the importance of individual security and individual validation of truth.
- Individuals see a need for multiple aliases as they navigate across tribal boundaries while simultaneously demanding stringent background checks for new entrants to a community.
- Burgeoning youth populations in the world’s poorest countries and among the world’s most insular religious sects generate increasing intolerance, social disorder, and violence.



Job skills decline among younger people, and many industries are threatened with serious labor shortages.

- The maintenance of older products becomes equally as lucrative as shipping new products as the adoption rate of innovation crawls and people reuse and reapply existing technologies and tools to new problems.
- The ability to move between networks and make new partnerships is crucial as local resources are often very scarce and insufficient to meet needs.
- Translation skills — at every level and in every way — are at a premium as the fragmentation of the world creates new social and cultural communities. As these communities evolve independent systems, even languages, people who can navigate cultural, linguistic, and information boundaries are in high demand.
- Information distrust is very high, leading to much missed information, which further enhances ignorance and reinforces insular behavior.
- Home schooling and religious schools dominate the educational environment.
- Community-oriented reputation systems that work from very trusted sources are one of the few community applications that emerge as valuable to the new, isolated communities.

## EXHIBIT 7: FREELANCE PLANET

Freelance Planet emerges from expectations that the current trend toward a connected, dynamic, network-centric workplace dominated by employers seeking resources — including knowledge resources — on a just-in-time basis will continue and perhaps accelerate. In this future, large corporations become holding companies managing relationships between independent contractors and small providers. Governments outsource core functions to entrepreneurial nonprofits and nongovernment organizations. People blend their private lives and work, managing multiple identities and networks and overlapping relationships by using technology that permeates every environment. Rapid innovation and creative thinking are competitive advantages. People and businesses invest continuously in learning. New hotspots of creative thinking flare up unpredictably all around the world, creating a kind of global attention deficit disorder as most people find it hard to sort out what will be important today, let alone tomorrow.

Some additional characteristics of this scenario include:

- Network, speed, and creativity rule. Traditional hierarchies become increasingly ineffectual as emergent systems succeed in surprising new ways, including distributed-intelligence networks that greatly enhance security.
- Previously disenfranchised groups enjoy growing influence; even so, a rapidly changing technological society is challenging to many institutions and people.
- More expertise is available online, allowing people to create just-in-time learning opportunities and further eroding any hope for the few remaining businesses built on proprietary practices or intellectual property.
- There is increased emphasis on relationship management in all aspects of life and across outsourced borders. People maintain massive contact lists that are tagged to help locate the right people for the right problem; contacts become contextual.
- Information security moves off the network and the operating system to the object, completely shifting security expectations as network penetration and operating system hijacking result in interesting experiments but do little to compromise the information encapsulated in content containers, some of which have protective behavior shells that limit access to their contents.
- A general blurring between enterprise and extra-enterprise networks is facilitated by new security software that quickly

analyzes objects on a device attached to a network and isolates any threats while allowing the user to connect to authorized data and applications. This development precipitates more open networks and drives closer collaboration among partners and customers.

- Strength and success in open innovation leads to the rapid development of new business models, new businesses, and new products and services.
- The short half-life of success means that many start-ups fail in half the time it took previous waves of innovation to be displaced in the market.
- The experience growing up in the rapid-fire, technology-saturated world of the 1990s serves next-generation workers well as they come to the workforce with strong collaboration skills, entrepreneurial instincts, and expectations of dynamic change and transparency.
- Schools are reinvented as open institutions with physical locations acting as education hubs for multiple generations and the Internet providing just-in-time learning constrained only by the needs of the learner.
- Surveillance is highly distributed and often personal with individual concerns driving how much peripheral vision is employed. Businesses and governments gather terabytes of video and audio data on a daily basis for later analysis should it be required by a law enforcement or regulatory concern.
- Popular spiritual movements help people stay connected to each other in some way other than electronically.
- Viruses are rampant but are not as lethal because they are often used as calling cards and proof points for freelancers looking to be hired.
- Aggregate wealth increases rapidly but is unevenly distributed. Localized boom-bust cycles come and go quickly based on innovation-learning-adoption curves.
- Very little loyalty remains between employees and employers. Many people work for more than one organization, and most organizations negotiate nonbinding agreements with employees. Guilds and associations form around scarce skills to negotiate longer term, more-binding contracts that cover classes of workers (for example, the company agrees to employ fifteen graphic designers, specifying what class, which also defines skill requirements and pay).

- Personal prioritization and attention management are hot software categories as people use software to help figure out what is important and maintain balance in their lives.
- People lose their distrust of Internet-based information providers, leading the way to global identification systems and retail reputation systems that span the breadth and depth of the global talent pool.

### **EXHIBIT 8: MAKING THE SCENARIOS REAL**

There is evidence in today's news to support the development of any of the futures outlined in the scenarios; the list of real stories, Web sites, and other references below reinforces the divergence of the scenarios. The combined weight of these references illustrates that planning for any one future is not the best approach. Recognizing the diversity of the potential futures helps reduce the myopia of believing that one future is more relevant than the others. As the future unfolds, all things remain possible, even those that people do not want to believe are possible. The scenarios when combined with this level of tracking help make alternative futures tangible and visceral.

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