A Phase Change: Forces, Trends, and Themes in the Human Sociocultural Milieu

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There are many concerns about the preparation of children, youth, and adults for the fast-paced, global sociocultural environment to which everyone must now adapt. This paper provides an overview of major forces, trends, and themes currently impacting lifestyle changes. Part II of this essay will address how formal and non-formal education experiences can facilitate the development of the necessary knowledge, attitudes, and skills that will allow societies to develop their human capital.

Viewed from space, the earth looks mainly tranquil, with periodic disturbances due to storms or volcanic eruptions. But a closer look shows an array of challenges, some global, some regional, and some local. Many people are concerned that something is not right with their lives and the direction of their countries. Education, whether it is in formal settings such as schools, or in its more non-formal or informal aspects, has the potential to develop the knowledge, attitudes, and skills that people need to adapt to the present and create a more promising future. The purpose of this paper is to provide a brief description of the current global context and likely pressures and trends that are impacting the present and will influence the near future. Part II will discuss how education and schooling systems can prepare children, youth, and adults to flourish and thrive in the twentieth century.

Overview

Developing an understanding of the sociocultural context is important for those concerned about preparing children and youth for successful adulthood, a primary issue for educators (Huitt, 2011b). One of the most important issues to consider is that humanity is in the final stages of a major transition from the hundreds of thousands of years spent as hunter/gatherers to another stable stage that will also last hundreds of thousands of years (Wallerstein, 2000). Gilman (2014) described this as a series of major transitions, first from Tribal to Empire (based on agriculture and industry) and now to Planetary (based on digitally-based multi-media telecommunications and networks). Each of these transitions should be considered a phase change in human history. Using this perspective, one might think of the Tribal age as the infancy phase of humanity, the Empire age as the childhood and adolescence phases of humanity, and the present era as the transition to a phase of adulthood (Christian, 2003, 2011). Graphically, this looks like an S-curve (Jobs, 2015) used extensively to describe change in economics (Bahmani-Oskooee & Hegerty, 2010). marketing (Nicholls, 1986), organizational development (Smither, Houston, & McIntire, 2016), as well as learning (Jaber, 2011) (see Figure 1).

The dynamically stable Planetary sociocultural milieu towards which humanity is advancing, barring some catastrophe, will more resemble the coming decades than those of the

early- or even mid-twentieth century. Just as the thinking and mental representations of the phases of childhood and adolescence must give way to those better suited for that of adulthood, humanity must transition from using mental representations suited to the age of empires to those suited to the planetary age.

Figure 1. S-Curve for Ages of Human History

Martenson (2011) advocated that three aspects of the sociocultural milieu, economics, energy, and the environment, must all be considered as overlapping and integrated systems when discussing challenges in any one of them. I would add demographics as a separate element (Martenson discusses this issue as embedded within economics) as it is a major factor in distinguishing among groups and their views on a variety of issues (Hymas, 2011; Leonhardt, 2012). The importance of discussing these factors within the context of a phase change is that the laws of operation change at each phase. Consider water and its elements of hydrogen and oxygen at different phases: solid, fluid, and gas. While the elements do not change, the laws of physics show substantial differences in operation at each of these phases. Likewise, while the elements of economy, energy, environment, and demographics are always present, their relationship changes in each phase of human history. For example, in the tribal period where the primary source of energy was human beings and the number of people on the planet was small, the limits to growth of the economy was related to the number of people alive at any given time. The use of resources and the production of wastes did not have any measurable impact on the environment.

However, the use of animals as a source of energy and the introduction of agriculture led to a significant increase in the human population; the overuse of the resources and the production of wastes had an impact at the local level where groups first flourished and then collapsed (eg, Bourton, 2009; Diamond, 1995), but it did not have an impact at the planetary level. It was when the primary energy source became the burning of fossil fuels that the human population began to increase substantially and the resources used and wastes produced began to be impactful for the planet (Intergovernmental Panel on Climate Change, 2014). It is not difficult to imagine that if all 7 billion people living on the planet were to use resources and produce waste at the level of Japan, Europe, and the United States (currently about 1.2 billion) that life would be unsustainable. In fact, estimates are that it would take about 3 earths to sustain 7 billion people

at the level of the European economies and perhaps 6 earths at the economic level of the USA (World Population Balance, 2015).

In order to prepare children, youth, and adults for a sustainable lifestyle in the planetary phase, a modified mental representation of reality must be created. Because one's map of reality is more significant to decision making and problem solving than actual reality (Koltko-Rivera, 2004), re-visioning schooling and education is going to require additional knowledge and understandings that go beyond the mental representation used to create the current systems. A quote widely attributed to Albert Einstein emphasizes this concept: "You cannot solve a problem from the same consciousness that created it. You must learn to see the world anew." These new understandings must include a valid conceptualization of the context in which humanity will live as well as an expanded view of the knowledge, attitudes, and skills necessary to thrive and flourish in that environment.

The following sections describes some of the forces, trends, and themes that must be considered when creating a new understanding of the opportunities and challenges facing humanity at this critical juncture.

Forces

Diamandis and Kotler (2012) focused on four forces that will lead to economic abundance across the globe, disrupting the basic foundations of economic based on the concept of scarcity. These are:

1. Advances in technology that are growing exponentially. These include a universal access to *informational and communications technology* through the use of smartphones with access to the internet even the remote people on the planet with better access to information than the wealthiest and best connected did just decades ago. Additionally, there are *transformational technologies* such as "computational systems, networks and sensors, artificial intelligence, robotics, biotechnology, bioinformatics, 3-D printing, nanotechnology, human machine interfaces, and medical engineering" (p. 10) that will significantly alter living standards for all of humanity. These technologies will expand the influence of the other three forces.
2. A *Do-It-Yourself (DIY) approach to innovation* that allows those without power or influence to tinker with the new technologies in creative ways. The technologies are becoming so affordable that anyone with time and curiosity can produce new products and services that can impact the lives of billions of people.
3. The availability of an *abundance of money* to facilitate innovation. As early entrepreneurs such as Bill Gates (Microsoft), Mark Zukerberg (Facebook), and Jeff Bezos (Amazon) create wealth with their innovations, they are funding additional innovation in a wide variety of areas.
4. An *emerging market* force created by the addition of billions of relatively poor people who have access to the new technologies and finances; this creates not only the opportunity for new innovations, but also a market for them.

Diamandis and Kotler (2015) summarized these forces as the "six D's of exponentials" (See Appendix A.) They proposed these forces build on each other to produce a wave that will impact human activity in a way that has never been previously experienced.

Looking at the same data, Kelly (2016) took a slightly different approach and described twelve technological forces that are driving change today. He described one of these changes as the process of *becoming* (or transitioning to a new era of humanity), by which he means a phase change described above. It is important to realize that, because of exponential change, humanity will quickly move into a context for which there is limited experience.

Kelly (2016) described three technological forces that might be described as impacting where and how humans access information: having *open access* to information, having the ability to *track data* through automatic processes because of extensive use of digitalized data, and having the ability to *screen incoming data* so that one has to look at only the most relevant information. Importantly, the ability to access and gather large amounts data will be ubiquitous, placing a strain on human processing systems. Huitt and Monetti (2017) discussed the relevance of open access in some detail as it applies to schooling and education. This will place tremendous pressure on business models that thrive on proprietary knowledge, perhaps making them obsolete.

Kelly (2016) described six technological forces that are impacting how data are processed and analyzed: the increased important of artificial intelligence to *cognify* data to help humans make sense of the overwhelming amount of data resulting available; the increased speed of the *flow* of data across the digital network; the increased importance of asking meaningful *questions* is because information will be essentially free and universally available; the need to *filter* data for specific relevance to questions that have been asked; the ability to *remix* information in new and interesting ways; and the ability to *interact* with the world in the process of learning. One implication of the latter is that educators will need to increasingly provide learners with the types of experiences they will use outside of formal education and provide opportunities for them to practice these developing capacities.

Finally, Kelly (2016) described what connectivism learning theorists (Bell, 2011; Downes, 2008; Siemens, 2004) believe to be an essential feature of twenty-first century learning: the importance of *sharing* and connecting to others what has been learned and produced through the learning process. That is, learners must become prosumers (both producers and consumers) of information.

In summary, there are underlying influences growing in power and potential that are providing the energy for sociocultural trends. Friedman (2016) summarized these forces as accelerations in technology, globalization, and climate change. Most importantly, all of these authors document the impact that personal computers, the internet, and now mobile smartphones have on social feedback mechanisms that allow for more data to be accessed and analyzed and a faster pace of innovation and demands for change by both individuals and institutions. This highlights the need to have a set of mental representations that are both stable and fluid. That is, human needs are likely to be relatively stable (Huitt, 2011a) while how those needs are met, both individually and collectively, will likely change quite dramatically (Desilver, 2014; Kurzweil, 2005). Early adopters of products and services, as well as ways of thinking that address these accelerations, will benefit tremendously while late adopters are left behind.

As a result of the intersection and integration of these forces, the networks of economic and sociocultural connectivity described by Khanna (2016) produce trends, which, considered together, can be organized into themes. These will strongly influence the daily lives of all humanity. It is as if people have been thrust into a fast-moving stream that is carrying everyone to a somewhat vague, poorly defined destination. And while it might not be possible to change the speed and direction of the stream, it may be possible to steer the boat and avoid destructive

obstacles by understanding those forces, trends, and themes. The next two sections provide an overview of some trends and themes.

Trends

Toffer (1971, 1981) was an early promoter of the study of sociocultural trends; he labeled the current megatrend the third wave (the first wave was the movement from hunter/gatherer to agriculture; the second wave from agriculture to industry). Other authors such as Naisbitt (1982), Gilman (1993), Kurzweil (1999, 2005), and Aberdene (2005) added to that literature. Some of these earlier identified trends are still relevant such as the importance of high tech/high touch skills, the dejobbing of the workforce, the increased importance of entrepreneurship and home-based businesses, the availability of multiple options for meeting needs and addressing challenges, and the increased use of values-based consumption and digital networks (Huitt, 1999, 2007). This section will review some ideas regarding influential sociocultural trends published subsequent to those reviews.

Schmidt and Cohen (2013), echoing earlier writing by Toffler (1981), pointed to a dramatic change from a physical-, analog-, and geographic-dependent context to one that has shifted to a digital, networked, and global milieu. Schwab (2016a&b) described an important component of this shift as the fourth industrial revolution, referring to the connection of billions of manufactured items through the internet (which Weber, 2016, labeled the Internet of Things). As digital technology becomes ubiquitous, powered by ultra-fast computing (with a desktop computer expected to have the processing power of a human within the next decade, Kurzweil, 2005), combined with sensors to provide data on every component within the manufactured product, and artificial intelligent algorithms creating meaning for all of this data, there will be an emergent sociocultural system that has heretofore only existed in science fiction. In fact, Weber suggested it will be only a lack of imagination that slows down the process for individuals and communities.

Schwab (2016a) summarized this synthesis of different technologies tied together via the digital network as producing major trends in three categories: physical, digital, and biological. Changes in the physical category, such as autonomous vehicles, robotics, new materials, and 3D printing, will have an impact on how and where products are created and how they are distributed. Organized information regarding how to create new materials and products using on-site 3D manufacturing can be stored in distributed servers and made available instantly across the planet. Additionally, advanced robotics will substantially reduce the need for human workers, as will driverless vehicles.

Schwab (2016a) agreed with Diamandis and Kotler (2015) that the impact of the second category, digital technology, will lead to an increase in available products and services, thereby leading to a reduction in costs. Schwab saw this as impacting the trend towards the sharing economy, where individuals or organizations can share a product or service rather than purchasing it. A perfect example is the growth of ride-sharing companies such as Uber and Lyft that first had an impact on traditional cab companies, public transportation, and car ownership (Buckley, 2014) while driverless vehicles will eventually have an impact on companies providing vehicle insurance (Mui, 2013).

With respect to innovations in biology, Schwab (2016a) identified astounding possibilities, from gene selection for embryos, to growing organs from a person's own cells, to immunotherapy for cancer and other diseases. Again, these breakthroughs are dependent on the

acceleration in technology that is providing ultra-fast computers connected via a global network and artificial intelligent algorithms that can create meaning from vast amounts of data. Without the trends in the other two categories discussed by Schwab, the biologically-based trends would not be possible.

Ross (2016) suggested that the changes identified by Schwab (2016a&b) and others, with which he is in substantial agreement, will have a quite different impact on people than did previous stages of innovation. Most importantly, instead of pulling large number of people out of poverty, these new trends will more dramatically impact those people who have enjoyed the benefits of a middle-class lifestyle. He stated that the forces discussed above have the potential to create conditions where large numbers of people are moved back to poverty levels because they have not been able to keep up with the knowledge and skills demanded in a fourth-industrial-revolution economy. The recent political events in Europe and the USA demonstrate the validity of his concerns (Judis, 2016).

Finally, GE and Accenture (2014), essentially agreeing with the importance of a tight integration of the physical/manufactured goods with digital data collected through sensors, predicted that up to 50 billion "things" will be connected to the internet by 2020, up from 25 billion in 2015. The importance of the data resulting from this integration cannot be overemphasized. One implication for educators at all levels is the need to move quickly to digitalize data regarding teaching and learning in order to take advantage of the data analysis capabilities that will be available.

Themes

Gilman (2014) and Martenson (2011), mentioned above, focused on the theme of sustainability because it involves multiple components and can present an existential crisis for humanity. He suggested that the impetus towards seeking a sustainable future will lead to a dramatic increase in innovative strategies incorporating a radically different approach to creating and maintaining a lifestyle. A major transition from Empire (based on agriculture and industry) to Planetary (based on digitally-based multi-media telecommunications and networks) demands a reconsideration of the strategies for success that have been prevalent for hundreds, if not thousands, of years. An overriding thesis is that in the empire age prior to the early twentieth century, humanity was living in an era where human reproduction limited how fast a society and its economy could grow. In the planetary era to which humanity is transitioning, the primary limitation will be resources and the production of wastes. Gilman described the importance of a more efficient use of resources and methods to either control wastes or to use them for productive purposes and identified several principles that can guide these changes: the importance of diversity, an increased use of cooperative, win-win strategies, and a low growth rate.

As an example of increased diversity, Gilman addressed how that characteristic is impacting occupations and how rapidly they change over a working lifetime, a present reality detailed by Morgan (2014). As an example of cooperation, Gilman suggested humanity will move away from hierarchical arrangements of social order towards more self-organizing and consensually collaborative structures. There will also be a move to forms of multi-media as a means of communication rather than the oral and linguistic forms of past eras. These changes will require a very different set of educational experiences than those now focused on generating a high score on a linguistically-based standardized achievement test of basic skills. As for a low

growth rate, Martenson (2011) points to the need to completely restructure the role of debt in economic practice. The challenge is not necessarily the level of debt, both public and private, but rather that debt levels are growing faster than economic activity. Therefore, unless debt is eliminated via inflation or bankruptcy, the only way it can be managed is through higher levels of economic growth. This is the opposite of what is needed for a sustainable global economy.

Martenson's (2011) concern is that because systems can overshoot their capacity to function, once a tipping point is hit there is little that can be done. The key to having a sustainable future or, as he puts it, a world worth inheriting, is to not hit the tipping point in the first place. Regrettably, that precise point is unknown and perhaps unknowable while the positive feedback loop that results in exponential change points to hitting it before it might be expected. This is a potential existential crisis, resulting in dramatic changes that would make the earth virtually uninhabitable, especially for the billions now living on the planet. These concepts are being discussed by experts and lay individuals alike (eg, Bardi, 2011; Jackson, 2009), but there has yet to be widespread social or political acceptance. The results are that the changes needed to avert an existential crisis for humanity are being postponed and growing in significance.

Fortunately, innovators are working diligently to address the overlapping factors of economics, energy, and environment identified by Martenson (2011). For example, Lovins (2012) proposed that the United States could dramatically change its energy use, save trillions of dollars, and do so in 50 years with leadership provided by private enterprise. Current data support a component of his approach; solar energy is one of the fastest growing areas of employment, with workers in the industry now greater than those working on oil rigs or gas fields (Gillespie, 2016).

Dent's (2014) analysis of the issue of demographics warrants a separate discussion apart from the other three components discussed by Martenson (2011). While Dent focused on the demographics of aging populations in developed economies, his analysis contrasted with those who focus on countries with exploding populations, especially India (Boyle, 2015) and sub-Saharan Africa (Pflanz, 2013). As people age, they are less economically productive, purchasing less goods and services (with the exception of health care). Unless there are sufficient births to counteract retirees, a declining workforce is left to support larger numbers of the non-working population. Dent showed this is the situation for all developed economies in addition to China and Russia. Without immigration by those living in faster growing societies, economic activity in developed countries is expected to decline, putting increased burdens on national populations above and beyond the forces and trends discussed above. However, increasing levels of immigration to economically-developed countries as well as the adoption of these lifestyles by the rest of the world means more people using a greater amount of resources and putting more waste into the atmosphere and oceans. There simply is no viable sustainable alternative that does not include dramatic structural changes in the economy, including how energy is produced, if the earth's climate is to remain viable for human existence.

Summary and Conclusions

In summary, there is widespread agreement that humanity is shifting from one phase to another. Some would set the date of the start of the transition in the fifteenth century and the development of expertise in naval travel (McNeil and McNeil, 2003). Others would suggest the invention of the telegraph in the mid 1800's or the invention of the computer in the mid 1900's

or even the development of the internet in the latter part of the twentieth century. Whatever date is selected it is clear that a digitally-based and networked communication system has set the stage for a dramatically altered life on the planet for humanity (Brynjolfsson & McAfee, 2011; Schwab, 2016a, 2016b), Being connected to this digital network is so important that it is now being discussed as a basic human need, like access to food, water, and shelter (Kravets, 2011); billions of dollars are being spent by entrepreneurs to meet that need (Barr & Pasztor, 2014; Griffin, 2013; Vance, 2013).

This ubiquitous digitally-based connectivity led Friedman (2005) to declare that 'the world is flat.' However, Smick's (2008) analysis of availability to connect to this resource led him to conclude that 'the world is curved.' Obviously, both are correct. The current pushback to globalization seen in the United States and Europe (Pylas, 2017) should be a reminder that the benefits of globalization are not distributed equally (Mendix, 2007) and those who believe they are being treated unfairly will not go along with policies they believe only favor elites (Brandtner, 2012).

Rosling (2009) added to this discussion when he demonstrated that connectivity is on a continuum among communities within nation states rather than groupings into developed and undeveloped countries. Khanna (2016) provided evidence to support both Friedmans's and Rosling's analysis that increased connectivity enhanced human well-being by allowing for more interaction, which is critical for innovation and economic activity. Khanna also cited the effect of urbanization for identifying the nodes on the network (see https://img.washingtonpost.com/blogs/wonkblog/files/2016/04/US-mega-region.png&w=1484). It will be vital for those not in a node or a connecting line to put extra effort into making sure they and their communities are adequately connected.

Another challenge to the concept of acceleration in technology and globalization is that while there has been a relatively irreversible progression of the major eras of humanity, there are dips and cycles within the major sociocultural transitions. Dips might be caused by a variety of factors such as war (both physical and cyber), financial emergencies, significant reductions in fossil fuels for energy, solar flares, disease, or disruptive climate change (Cobb, 2014; Martenson, 2011). While the probability of a global or even national catastrophe that would impact the factors and trends discussed in this paper might be extremely low, they are not zero and, therefore, should not be dismissed lightly.

As for cycles, Strauss and Howe (1991) as well as Dent (2014) described an 80-year cycle consisting of four generations or turnings: growth, maturation, entropy, and destruction. Strauss and Howe showed how a series of cycles have played out over the last five centuries covering first British and then American societies. Each cycle starts with a spring season or first turning with a focus on strengthening social institutions and downplaying individualism. This is in contrast to the preceding winter season in which there is a lack of trust in both institutions and individual competencies. The focus on social order in the first turning or spring season produces a pushback in the second turning or summer season. This season has a focus of spiritual upheaval focused on purpose and meaning where both institutional and individual forces are in relative balance. This, in turn, gives way to the third turning or autumn season with a focus on individualism and a turning away from institutional functioning. Finally, there is the return of the winter season with trust lost in both individuals and institutions and decay or destruction is at its height. Strauss and Howe (1997) stated the USA and the UK are presently in a winter season and will remain in that season until sometime in the 2020s.

While this declining period of the cycle has occurred many times before, the current situation is much more complex because of a more tightly integrated global economy (Haass, 2017; Schwab, 2016) and the exponential change brought about by technology as well as the higher percentage of people living in urban areas (United Nations, Department of Economic and Social Affairs, 2014; United States Census Bureau, 2012). This makes the potential for any disruption such as a financial downturn that would make it difficult to transact business or an electromagnetic pulse caused by a solar flare that would disruption digital communications to be extraordinarily challenging. Encouraging individuals and communities to consider and prepare for a disruption, as least minimally, would be prudent given the finely-tuned, interconnected components of modern life (Crotty, 2009; Gilpin, 2000). Preparing to handle potential disruptions as well as to take advantage of the opportunities provided by the forces, trends, and themes discussed in this paper will allow people to become more resilient and increase the likelihood that they will be adapt to both growing and declining situations.

It is relatively more easy to identify the forces and trends, as well as the potential disruptions, than to identify the impact that their integration will have. For example, in a quote attributed to William Gibson, "The future has arrived—it's just not evenly distributed yet" (Quote Investigator, 2012). Making precise predictions of the innovations or the timing of any disruptions is quite difficult. This presents a challenge for parents and educators as they attempt to prepared themselves and the children and youth for whom they have responsibility to make decisions about curriculum and teaching methods and accompanying policies.

Overview of Implications for Education and Schooling

It is common practice to equate education with schooling (LaBelle, 1982), but this is not quite correct. Rather schooling refers to formal education, primarily from kindergarten through high school, where children and youth are guided through a program of instruction that society believes is important so that they are free to make choices as to how to how to live their lives as self-sustaining adults and contribute to society in adulthood. However, it equally applies to higher education in its many forms – technical, undergraduate, graduate, and professional. By its very nature, the processes of schooling are conservative, looking backward at what was successful in the past as a guide for developing curricula, including not only content standards and objectives, but also methods of instruction and assessment (Stefani, 2004-05).

That conservative process tends to work well in stable times, but presents a challenge in times of rapid change. In those circumstances, such as the one in which humanity is now living, it is important to look to expectations for the future to guide thinking and practice regarding the development of human capital. A challenge is that one's created mental representations of reality, used to determine what is worthy of attention and how facts and concepts should be organized and understood, are built based on practical experiences and social interactions (Huitt, 2017). Changing those representations during times of rapid change requires creative imagination which often challenges the knowledge base that is the foundation of the mental representations. For example, as first England and then America transitioned from an agricultural- to an industrial-based economy, the preparation of children and youth for adulthood underwent massive changes. These were basically adapted from changes in the Prussian education system that were made after a Prussian defeat in the Napoleonic Wars in the early nineteenth century and implemented worldwide as England managed its vast Commonwealth (Hayes, 2006).

The schooling system that developed based on a modern mental representation served the USA and other emerging economies well in their transition to modernity. A highpoint in the USA was an increase in high school graduation from six percent in 1900 to over 70 percent in 1970 with an accompanying increase in personal income (Goldin, 1998). More recent data showed graduate rates are increasing (Bidwell, 2015), although the rates are being questioned because of suspicions regarding program standards and measurement issues (Kamenetz, 2015). Nevertheless, when done well, schooling provides a nation with an ever-increasing supply of the human capital necessary to take advantages of the opportunities that rapid change provides.

Maxwell (2016) showed that the worldviews that formed the basis of first a movement from a tribal, hunter/gatherer era, then to an agricultural era, and subsequently to an industrial era had specific components that allowed human beings to make sense of the world in which they lived. However, the worldview that will allow people to understand the exponentially accelerating digital/information era in which humanity currently exists has not yet been developed. Maxwell hypothesizes an emerging worldview as having a teleological component pulling the cosmos and its components to novelty and higher levels of consciousness. This is very different from the present worldview hypothesizing stability and permanence as central principles for reality.

A primary issue for parents, educators, and policy makers is first, how to understand a set of mental representations, including one's worldview, that more accurately describe the current sociocultural milieu, and second, how to shift the schooling and education system from a focus on stability and permanence to one of novelty and a higher level of consciousness. This is a complex issue as the process is underway, but not yet complete.

When describing the process of paradigm change in the sciences, Kuhn (1972) found that practitioners rarely changed their orientations; rather they were replaced by younger scientists who adopted the different paradigm at an early age. Unfortunately, this replacement process is likely to prove unacceptable for developing human capital today. The knowledge and skills needed for success are simply changing too rapidly to wait for a new generation to be trained and educated. Rather a variety of educational opportunities, formal, non-formal, and informal, must be provided to children and youth, and adults, if a society is not only to keep pace with the forces and trends described in this paper but adapt to them to build a more peaceful, sustainable world order. This will be the focus of part II in this series.

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Appendix A
The Six D's of Exponentials*

1. Digitalization—any information that can be digitalized can be spread across the globe at the speed of the Internet. This speed is increasing exponentially along with the empowerment provided to individuals and institutions to use this information.
2. Deception—in the early stages of exponential growth (the very beginning of the S curve), exponential growth is not noticed. It is not until an inflection point (such as has occurred in population growth in the twentieth century) that the exponential rate of change is perceived.
3. Disruption—the result of exponential change is disturbance to the status quo. The speed of change demands that one is vigilant to how change might impact one's life, organization, community, etc.
4. Demonetization—in a digitalized environment, the direction of the price curve is towards zero. The result is that new forms of monetization must be identified quickly; this applies to individuals as well as institutions. Anyone who has used Skype or Facetime for long-distance video conferencing can attest to the power of dramatically less expensive communications.
5. Dematerialization—refers to the reduction and even elimination of products and services as a result of the previously discussed forces. Diamandis and Kotler described how the inclusion of a camera in smartphones has reduced and even eliminated the need for inexpensive hand-held digital cameras. The same can be said for driverless vehicles; the need for drivers will be dematerialized.
6. Democratization—the end result of the previous forces; once products and services have undergone the changes described above they become so cheap and ubiquitous as to be available to almost anyone. However, it will be necessary for individuals to seek out these demonetized, dematerialized products and services and one's mental representations will be instrumental in deciding to do so.

* Diamandis, P., & Kotler, S. (2015). *Bold: How to go big, create wealth and impact the world*. New York, NY: Simon & Schuster.