



Technological University Dublin
ARROW@TU Dublin

System and Institutional Design and Transformation

Higher Education in Transformation Conference, Ontario, 2016

2016

Making Sense of the Future of Post-Secondary Education

Michael A. Rostek Ph.D.

University of Ontario Institute of Technology, michael.rostek@uoit.ca

Follow this and additional works at: <https://arrow.tudublin.ie/heit161>

 Part of the [Higher Education Commons](#)

Recommended Citation

Rostek, M. A. (2016, November 2-6). Making Sense of the Future of Post-Secondary Education. Paper presented at the *Higher Education in Transformation Symposium, Oshawa, Ontario, Canada*.

This Conference Paper is brought to you for free and open access by the Higher Education in Transformation Conference, Ontario, 2016 at ARROW@TU Dublin. It has been accepted for inclusion in System and Institutional Design and Transformation by an authorized administrator of ARROW@TU Dublin. For more information, please contact yvonne.desmond@tudublin.ie, arrow.admin@tudublin.ie, brian.widdis@tudublin.ie.



This work is licensed under a [Creative Commons Attribution-Noncommercial-Share Alike 3.0 License](#)



MAKING SENSE OF THE FUTURE OF POST-SECONDARY EDUCATION

Making Sense of the Future of Post-Secondary Education

Michael A. Rostek, CD, Ph.D.

University of Ontario Institute of Technology

Presented at the Higher Education in Transformation Symposium

November 2 - 4, 2016 in Oshawa, Ontario, Canada

Abstract

The complexity and uncertainty of today's global environment has created a bewildering array of interactions and interdependencies across all societal sectors including the educational sector.

While many believe that modern communication and information technology reduces uncertainty and complexity, paradoxically, the "real effect is the opposite: information overload leads to a "poverty of attention" (Nye, 2002, p. 43) that complicates the process of filtering out the critical signals from the distracting noise" (Habegger, 2010, p. 49). Past methods for examining and understating this environment have proven to be ineffective in this fast-moving environment and sector leaders are now required to systematically assess their environment "in order to reduce surprises, to increase the room for manoeuvre, and to improve the overall flexibility of governance" (Habegger, 2010, p. 49).

Increasingly, strategic foresight is used to respond to this new environment. "Foresight is the ability to see developments before they become trends, to recognize patterns before they emerge, and to grasp the features of social currents that are likely to have an impact; it is not the ability to make predictions" (Rohrbeck & Schwarz, 2013, p. 1593). Strategic foresight begins with an environmental scan of the contextual environment, "that part of the environment which has important repercussions for the organization but in which it has little or no influence" (van der Heijden, 2010, p. 115). Within the contextual environment, PSE institutions do not have direct influence but must understand economic developments, demographics, politics, technological developments and social developments in order proactively respond to the rapidly changing PSE environment.

Keywords: post-secondary education, trends, environmental scan, strategic foresight, Ontario, Canada, social, technological, environmental, economic, political, STEEP

Making Sense of the Future of Post-Secondary Education

Introduction

The future cannot be accurately predicted. Indeed, uncertainty and complexity are predominant characteristics of the future Post-Secondary Education (PSE) environment. Yet PSE establishments around the world must strive to understand and define how their strategies and policies will meet the challenges arising within this emerging paradigm. Perhaps more to the point, there are few PSE institutions around the world that engage in long term strategic planning and arguably they continue function within an environment of reactive response as opposed to proactive adaptation (for further explanation see Rasmus, 2012).

Our world today is characterized by exponential change. We traditionally think of change as a linear phenomenon; that is, output is proportional to input. As noted by Bisop and Hines, "Most change is not proportional to the effort expended, and thinking so can be quite misleading" (Bishop & Hines, 2012, p. 47). A particularly good visualization of exponential change is as follows:

...if I were to take 30 linear steps, it would be one, two, three, four, five. After 30 linear steps I'd end up 30 paces or 30 meters away and all of us could pretty much point to where 30 paces away would be. But if I said to you take 30 exponential steps, one, two, four, eight, sixteen, thirty-two and said where would you end up? Very few people would say a billion meters away, which is twenty-six times around the planet.

(Diamandis, 2016)

While exponential change, positive or negative, is not continuous (it will eventually end and often without notice), it creates considerable uncertainty and disruptive stress for organizations and PSE organizations are not to be excluded.

Preparation for future uncertainty and disruptive stress is obviously a daunting task. To be sure, a vast amount of information is available which can offer guidance for understanding the scope and magnitude of change. However, making sense of that information and its academic application is often difficult. In this context, futuring and foresight (see Cornish, 2004) offer considerable value as these growing international disciplines are designed to "critically examine the difficulties associated with making decisions with long term future consequences in conditions of uncertainty and to provide methods through which these difficulties can be minimised" (Dator, 2002, p. 240). Use of strategic foresight offers a means of ensuring more systematic and rigorous future planning. Indeed, the purpose of strategic foresight is to systematically explore, create, and test both possible and desirable futures in order to improve decision-making. It includes analysis of key dimensions of the global environment, how conditions may change as a result of major trends and drivers at work in the international system, and the implications of such changes for implementation of policies and actions. While not a science, the use of strategic foresight can be used to provide a framework to better understand the present and expand mental horizons.

Strategic foresight also leads to value creation for an organization in a variety of ways; increasing innovative capacity, situational awareness in advance of strategic planning, perceiving and interpreting changes in the operational environment, or simply provide a common platform designed to foster discussion about the long-term future of an organization. In whatever form, organizations today are increasingly turning to strategic foresight to better understand the complex and rapidly changing environment within which they must function.

Canadians should be justly proud of their academic institutions however, because they are successful, they must change (Hardt, 2015). This is not a glib statement but rather a clarion

call for action to address the pressures of change to PSE institutions such as rapidly evolving technologies, demographic changes, changes in government funding, among others. While some PSE institutions are invariably better positioned to respond to rapid change, leadership in all PSE institutions should be seized of the emergent PSE environment and strive to function with its attendant uncertainty and complexity. One such example is the research being conducted by the Futures Forum at the University of Ontario, Institute of Technology (UOIT).

This paper represents an environmental scan designed to critically examine the future of PSE in Ontario and Canada. The aim is to highlight the drivers and trends that have been observed in the last two years with a view to making sense of the contextual environment where changes that occur are generally beyond the control of PSE institutions. It should be noted that an environmental scan is a critical step in any strategic foresight process (see Conway, 2016). The cumulative result of this research will provide a foundation upon which to better appreciate the various forces and causal mechanisms that could arise as the future of PSE unfolds at an increasing rate.

The PSE Environment

When undertaking a study of the environment within which PSE institutions operate, it is first recommended to understand its spheres of interest. The environment can be broadly classified as the contextual, transactional and organizational components as seen in Figure 1.

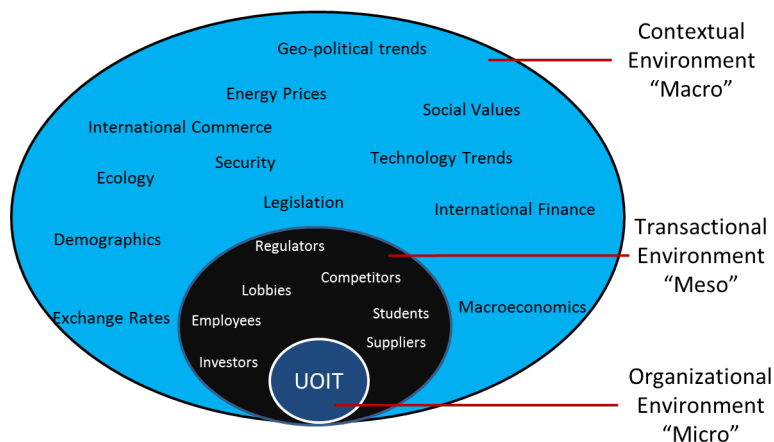


Figure 1. The Contextual, Transactional and Organizational Environments (Ramirez, 2014)

The “contextual” environment represents, “that part of the environment which has important repercussions for the organization but in which it has little or no influence” (van der Heijden, 2010, p. 115). Within the contextual environment PSE institutions do not have direct influence but must understand economic developments, demographics, politics, technological developments and social developments as they ultimately affect the transactional environment. The nearer term transactional environment defined as “that part of the environment in which the organization is a significant player, influencing outcomes as much as being influenced by them” (van der Heijden, 2010, p. 115). This is where universities will interact with market forces and be concerned with suppliers, supply and demand, distribution, competitors and strategic alliances. The organizational level involves the internal environment of the university and is concerned with vision, mission, strategy, resources, processes, products and services.

While there is considerable debate about where the boundaries between the three environments exists, it is a useful way to understand to classify the environment. It should be understood that the boundaries that exist between the three environments will be different for each organization. Mapping the environments, in particular the contextual environment, can be a time consuming and laborious endeavour due to the increased availability and amount of

information that must be processed to obtain an accurate picture (Camponovo, Ondrus & Pigneur, 2005). However, the benefits of pursuing knowledge of the contextual environment will assist organizations to make more informed decisions about their future by developing an understanding of the interdependencies within their contextual environments thereby avoiding “tunnel-vision” or “overconfidence” (Ramirez, Selsky & van der Heijden, 2010, p. 138). This in turn will aid in strategy adaptation, especially where complexity and uncertainty are dominant.

Mapping the contextual environment is accomplished through environmental scanning. “Environmental scanning is the acquisition and use of information about events, trends and relationships in an organization's external environment, the knowledge of which would assist management in planning the organizations future course of action” (Choo, 1999, p. 21). This process typically focuses on a large number of areas – in effect covering every major sector of the environment that can assist management in planning for an organization’s future. (Choo, 1999, p. 21). It also involves the use of four basic techniques, undirected viewing, conditioned viewing, and both informal and formal search of both primary and/or secondary sources of information (for more detail see Choo, 1999). All four techniques are essential to the method’s effective use.

While many tools exist for environmental scanning for an organization, perhaps the most commonly used method is to analyze the Social, Technological, Environmental, Economic and Political aspects (STEEP analysis). The purpose of STEEP analysis is to look at the contextual environment, to characterize the drivers that are operating – and then consider what – if any – effect they might have on the organization’s future activities (Waverly Management Consultants, 2006). The acronym STEEP represents the following categories:

- Social. Factors include the cultural aspects and include health consciousness, population growth rate, age distribution, career attitudes and emphasis on safety.
- Technological. Factors include technological aspects such as R&D (Research and Development) activity, automation, technology incentives and the rate of change in technology.
- Environmental. Factors include ecological and environmental aspects such as weather, climate, and climate change which may especially affect industries such as tourism, farming, and insurance.
- Economic. Factors include economic growth, interest rates, exchange rates and the inflation rate.
- Political. Factors are how and to what degree a government intervenes in the economy, this include areas such as tax policy, labour law, environmental law, trade restrictions, tariffs, and political stability (adapted from ISSThinkTank, 2016).

While other models exist for environmental scanning (i.e., PESTLE) it must be recognized that the models are merely a guide that can be adjusted to meet organizational information needs. Environmental scanning should also provide peripheral vision and a long-range perspective for the organization. This is accomplished by focusing on the following:

- Trends - discernable patterns of change (i.e., Military use and adaptation of commercial innovations and services is increasing);
- Drivers - factors that directly influence or cause change (i.e., Exponential growth in computing capacity (continuation of Moore's Law);
- Shocks - high impact low probability events (i.e., Accidental misuse of nanotechnology ('grey goo'); and
- Key Uncertainties - unknowns and controversies to be clarified in the future (i.e., whether cyber security efforts will remain ahead of cyber attack proliferation).



Figure 2. The Contextual Environment and STEEP

The following represent a summarized environmental scan for trends and drivers in the contextual environment for PSE for Canada.

Demographics

In terms of the social context, arguably the single most significant trend for universities is demographics. More specifically, our aging population is considered a “global” megatrend which has projected relevance for at least 20 years (Dobbs, Manyika & Woetzel, 2015). Declining birth rates and steadily increasing life expectancy, particularly in Canada, are responsible for this trend (Statistics Canada, 2008, p. 25). As indicated below in Figure 3, in 2006, the reduced base of the diagram indicates declining youth population. As correctly estimated in 2008, today, “[f]or the first time, the number of persons aged 65 years and older exceeded the number of children aged 0-14 years” (Statistics Canada, 2015).

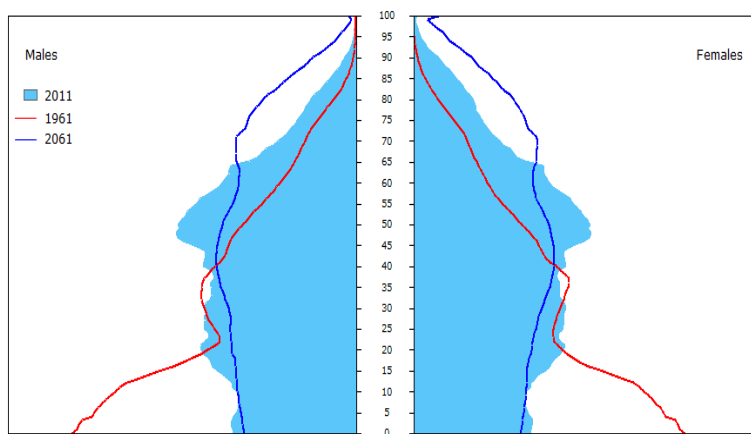


Figure 3. Demographic Trends to 2061(Statistics Canada, 2016, p. 8)

The implications of this trend are readily evident on university campuses today: The profile of today's college-going population looks much different than it did decades ago, when the average student was a fresh-faced 18-year-old moving directly from high school to campus. Students today are older, more experienced in work, and more socioeconomically and racially diverse than their peers of decades past. (Merisotis, 2015)

Just as the student body is changing, so too are the demographics of the faculty, with more staff who are older, adjunct and part-time staff, raising new issues in managing people within the institution. Demographics are major drivers of change in post-secondary education. (Contact North, 2016, p. 6)

Urbanization

Urbanization "will be one of the most significant dynamics affecting the future, presenting both opportunities and risks" (Bentham & Chye, 2014, p. 2). Urbanization has been identified in several research areas as a global megatrend. "Global megatrends are not short-term issues. They are projected to have relevance for at least 20 years, shaping the role of governments into 2030 and beyond" (Dobbs, Manyika & Woetzel, 2015). Today, approximately

54 percent of the global population inhabit urban environments with a projected growth to 66 percent by 2050 (United Nations, 2014, p.1). While much of this growth is projected to occur in Africa and Asia, the impact of this trend will also resonate within Canada.

Urbanization is well advanced within Canada. Today, more than 81 percent of Canadians live in urbanized areas with 86 percent of Ontarians living in urbanized areas (Statistics Canada, 2011). While the urbanization trend represents a general focal point for post-secondary student recruitment, it should not be viewed as a panacea in that there remain countervailing trends, such as on-line learning and greater student mobility, that will further determine the origins of students.

Immigration and Diversity

Approximately two-thirds of Canada's population growth is derived from immigration (migratory increases) and indeed, this is considered a Canadian megatrend. Statistics Canada projection reveals that:

...immigration will not only continue to be a key driver of population growth in the coming years—without it, Canada's population growth could be close to zero in 20 years, as the population continues to age and fertility rates projected to remain below the replacement level of 2.1 children per woman. (Statistics Canada, 2015)

Immigration to Canada is considered an urban phenomenon with immigrant's concentration primarily in three cities: Toronto, Montreal and Vancouver. Overall, today more than 91 percent of immigrants settle in urban areas. Further, "[b]etween 2006 and 2011, census metropolitan areas grew at a rate of 7.4 percent above the Canadian average of 5.9 percent" (Press, 2012). The impact of urbanization is expected to continue well into the future.

With increased immigration comes greater diversity and pluralism for PSE. New cultural backgrounds and learning styles will more likely require changes in faculty profiles, curricula and teaching approaches. Language will become a significant issue as visiting students and immigrants may require greater support in this regard. There is no doubt that immigration and diversity will present considerable challenge for PSE institutions of the future:

Diversity has certainly created a richer environment of institutions, students, and opportunities but it presents enormous challenges for establishing appropriate standards or benchmarks that can be compared from one institution to another and from one country to another. (Altbach, Reisberg & Rumbley, 2009, p. 64)

Digital Technologies

Digital technologies are considered a mega-trend transforming PSE as they have created a universal means of instantaneous contact and simplified scientific communication. Digital technologies are transforming the way education is delivered and accessed with Massive Open Online Courses (MOOC's), open educational resources (OER) and the rise of on-line learning being the most recent manifestations of advancements in this arena (Boker, 2012). In the last decade, the presence of digital technologies (i.e., databases, email, websites, social networking tools, blogs, wikis, podcasts, online video and instant messaging, among others) within tertiary education has expanded exponentially, and touched virtually all dimensions of the higher education enterprise (Altbach, Reisberg & Rumbley, 2009).

Machine learning and artificial intelligence are also growing exponentially. Smaller more powerful smart devices are becoming ubiquitous with an increasing ability to identify patterns of behaviour signaling the emergence of more personalized learning. When coupled with the analytics from big data fueled by the Internet of Things (IoT), a picture emerges where

assessment, retention and completion of PSE is greatly improved. Supporting these trends, emerging developments in gamification and virtual reality will enhance the learning experience.

Learning Mobility

Disruptive technological advancements, such as online and open courseware, have the potential to fundamentally alter the education sector. With claims of rigorous learning activity at a degree level, these mobile learning platforms provide opportunities for those struggling with rising tuition, international students or those who simply want to design their own programs. Indeed, in some cases, online learning is now legitimized by mainstream universities. These mobile learning platforms are leading to disintermediation of education; that is, whole or in part elimination of intermediaries such as post-secondary institutions. Massification or democratization of higher education, a trend that has been ongoing in Canada since late 1960s, challenges the traditional form of universities where only a select few gain access (Trow, 2000). Recently, "...gross enrolment ratios of those seeking higher education globally has risen from 13.8 % in 1990 to 29 % in 2010" (Hornsby and Osman, 2014, p. 712.) From a technological perspective, the most prominent manifestation of this trend is represented by the rise of MOOCs (i.e., Coursera, edX, Udacity, etc.) and blended learning:

The arrival of Massive Open Online Courses (MOOCs), some of which can now be used to secure transferable credit, and the rapid development of blended learning have had an impact on these institutions and on the system as a whole. Online learning is no longer seen as novel or innovative – it is one of the tools available for teaching and learning and is in widespread use. (Contact North, 2016)

While technology is enabling this flexibility, it would be a mistake to think learners are simply demanding more online learning. What they are seeking is greater flexibility and a more

personalized learning journey (see U.S. Department of Education Office of Educational Technology, 2016, p. 12). Other means of a more personalized experience may also come in the form of a flipped classroom, meaningful mentors for learners, personalized and adaptive learning pathways and social robots designed to be learning companions and catalysts (Prince, Swanson & Saveri, 2016).

Funding Model Shifts

The political context for PSE is changing as both provincial and federal governments come to terms with increased complexity and competitiveness within the education sector. Arguably, the manner in which financial support is allocated to universities has shifted from that of 'support to teaching' to that of 'support to research' through the emergence of programs such as the 'Canadian Research Chairs' and 'Foundation for Innovation' programs (see Academic Matters, 2016). It is argued that this has been a deliberate resource allocation move by governments which has further manifested itself in the dramatic increase in contract faculty positions (Ontario Confederation of University Faculty Associations, 2016, p. 4). Shifting government funding is also evidenced in the downloading of costs for PSE to students and families through significant rises in tuition costs. A recent Ontario government initiative is representative of the shifting funding model and was contained in the 2016 Ontario Budget, "Improving Access to Postsecondary Education", whereby student financial assistance was changed to make PSE more accessible and affordable (Ontario Government, 2016). It should be noted that this shift is "...not a change to the province's tuition fee policy – fees can continue to rise by three per cent a year" (Ontario Confederation of University Faculty Associations, 2016, p. 1). As noted by OCUFA:

While improving access to postsecondary education is a welcome policy goal, it is important to recognize that the 2016 Budget makes no additional real public

investment in university operating budgets. Our universities are already the lowest funded in Canada on a per-student basis, and this situation will continue to worsen. This will have predictable effects on the quality of education at Ontario universities. Class sizes will continue to rise without new funds to support full-time faculty hiring. The number of precariously employed professors will also grow, trapping many in insecure, unsupported positions. While the government has moved to increase access for low income students, the worsening financial environment begs the question, “access to what?” (Ontario Confederation of University Faculty Associations, 2016, p. 1)

Industry - PSE Integration

It is well acknowledged that PSE influences economic competitiveness in a knowledge-based economy. However, alongside the trend of reduced public funding for universities as a result of austerity programs, from 84 percent in 1979 to 58 percent in 2009 (Brownlee, 2016), there has been a rising integration between industry and PSE on several fronts, university research being one such integration area:

Corporatizing academic research has gone hand in hand with the decline of basic research funding, even though it is basic research that has yielded many of the world’s most important scientific and technological advancements (not to mention those of major commercial significance). (Brownlee, 2016)

Further, corporation influence in PSE continues:

Across the developed world, many schools are likely to be increasingly run (or at least sponsored) by powerful corporate organizations or by parent groups. There may be

much-reduced government oversight and involvement. (United Kingdom, Ministry of Defence, 2014, p. 63)

Other Industry-PSE Integration efforts can be viewed in programs such as "work-integrated learning" (WIL) (The Canadian Chamber of Commerce, 2014) (for detail of WIL see UOIT, 2014, p. 9). WIL has emerged amid demographic change, economic globalization, and the emergence of an increasingly knowledge-based economy which have in turn triggered rapid and unprecedented change in the Ontario labour market and in the skills required by employers (Sattler & Peters, 2011, p. 3). While not exhaustive, a WIL typology goes beyond Co-Op and includes apprenticeships, field experience, mandatory professional practice, internships, applied research projects, and service-learning. While not an entirely new concept, WIL is as much about learning as it is about work requiring greater investment in response to our current operating environment. As noted in Ontario Premier Kathleen Wynne's Highly Skilled Workforce Expert Panel report:

The benefits of work-integrated learning (WIL) are clear. The final report..., notes that WIL plays a valuable role in helping individuals hone their future career objectives. Greater collaboration between schools and workplaces will help new ideas flow between them; it's students who often bridge these gaps. And at a time when the world is changing rapidly, WIL helps to ensure that we are providing students with the skills they need. (Sattler & Peters, 2011, p. 3)

The Emergent Student

Future students will continue to be tech-savvy and will be able to manage multiple on-line platforms and applications. They will be connected with attitudes and behaviour shaped by social media, peer reviews, message boards, blogs, twitter, virtual 3D environments at pop

culture (Wilson, Morrell, & Hargrave, 2012, p. 8). They will seek educational experiences that reflect the connected real-time and social context of the web (Wilson, Morrell, & Hargrave, 2012, p. 8) which will lead to a more circuitous, mobile or nomadic career path.

Students have exhibited an increasing tendency to want educational experiences that are directly relevant to their personal and/or professional interests and objectives, particularly as they relate to employability. (Altbach, Reisberg & Rumbley, 2009, p. 3)

Indeed, future student cohorts are expected to have 15 jobs throughout their professional career (Harris, 2014). As such, students will seek greater relevance in a rapidly changing global economic environment.

Coupled with the emergent student described as the "Net Generation", we are also capable of understanding ourselves in new ways that can have impact on how we learn. Scientists are unlocking the challenges of understanding our physiological and neurological functions creating a greater knowledge of ourselves. Individuals are capable of monitoring physical performance, sleep, nutrition and social interactions through wearable technologies. This same interactive engagement is now being developed with neurosciences through wearable neuro signaling devices such as Thync among others (for details see "Thync", 2016). Insight into how the mind works is being used to uncover motivational learning, avoidance of information overload and student-teacher communication (Prince, Swanson, & Saveri, 2016). From teaching training to curriculum design, companies such as the Institute for Applied Neuroscience are researching how students learn best and how these insights may be translated into the classrooms.

Life-long learning will become a necessary aspect of the future. "The student experience in the 21st century will likely be characterized by more years of engagement with education over

the course of a lifetime, as well as greater options in terms of what, when, and how to study" (Altbach, Reisberg & Rumbley, 2009, p. 109).

Adult education learning will play an important role for ageing workforces everywhere as individuals seek to enhance career and personal development, or to switch careers altogether. An older working population will also need to adapt their skill sets as workplace and employer requirements change over their longer working lives. (Wilson, Morrell & Hargrave, 2012)

Further, it is expected that students leaving academic institutions will look for greater meaning in their alumni organizations. They will exploit alumni networks in order to bring some constancy to an uncertain and varied career future.

Sustainable Campus

Sustainability is a key issue for PSE institutions. Indeed, Ontario "...understands that its higher education institutions – through the students they educate, the discoveries and innovations they produce, the economic return they offer and the communities they support – are the foundation of a modern, knowledge-based economy" (Weingarten, Hicks & Moran 2016, p. 5). While Weingarten et al. were focused on financial and quality of education in their report, a part of the sustainability equation must include the physical and virtual campus debate.

The rise in virtual campuses and on-line students over the last decade has indeed been a significant trend contributing to learner mobility and massification of education. However, this trend has also reaffirmed that the benefits of a physical learning environment cannot be completely replaced by technology:

...one cannot disregard the advantages that a physical campus can bring in terms of access to facilities, research equipment and other resources. Nor should one overlook the basic human need for physical social interaction. Chance encounters, serendipitous

conversation and recreational activity all play a fundamental role in any one person's education and life journey. (Wilson, Morrell & Hargrave, 2012, p. 20)

Having said that, physical learning spaces will have to go beyond the traditional concept of a classroom. The "classroom" (see Miller, 2001) will have to be redefined becoming a more flexible learning space where students genuinely want to spend time driven by either a physical aspect, such as the development of smart learning environments which uses data from wearable devices to tailor learners' surroundings and resources to their needs, or make use of augmented and virtual reality tools (Prince, Swanson & Saveri, 2016). These new learning spaces will shift from fixed structures organized around administrative convenience becoming a fluid network and relationship-based formats reflecting learners needs, interests and goals (Prince, Swanson & Saveri, 2016).

Futures campuses will become a blend of physical and digital environments where students will be afforded the opportunity to seamlessly move from one environment to the other allowing them to optimize their learning style. Naturally, these issues should shape how campuses are constructed but perhaps more importantly, they may very well impact on student applications, a key revenue source for the financial sustainability of the university. (Weingarten, Hicks & Moran, 2016, p. 7)

Lastly, pressures will continue from an environmental perspective as universities move towards "greener" physical structure solutions. Indeed, the launching of the "Growing Greener Campuses at Ontario Universities" and "Growing Greener: 2014 Report on Environmental Sustainability at Ontario Universities"(Council of Ontario Universities, 2014) are indicative of the growing environmental concerns around university sustainability. The emergence of "green" building standards, environmental mobility solutions, generation of renewable energy, waste

audits, etc. are indeed indicators of the importance of the environment to sustainability of universities.

Issues such as energy consumption and carbon emissions will become more important as universities and colleges try to attract students using improved sustainability credentials, policies and practices. (Wilson, Morrell & Hargrave, 2012, p. 21)

The preceding paragraphs represents a glimpse of drivers and trends that are existent in the contextual environment concerning the future of PSE. To be clear, this list is not exhaustive. The drivers and trends above were selected to broadly touch upon each of the STEEP categories in order to give a sense of the contextual PSE environment itself. While this is a useful exercise in and of itself, perhaps more important is how this information is used to create value for a PSE institution. In accordance with a strategic foresight process, this is accomplished through the subsequent development of scenarios followed by evaluation and linking to strategy decisions for the PSE institutions. Leadership, visioning, planning and change management are necessary subsequent activities that extend the reach and usefulness of environmental scanning (see Bishop and Hines, 2012, pp. 223-224).

Conclusion

It is clear today that our PSE system is undergoing transition in response to the uncertainty and complexity in the global environment. Exponential change is prevalent in driving complexity and uncertainty creating disruptive stress within organizations. Status quo is no longer an option if PSE institutions are to prosper in this new environment. One method of dealing with this turbulence, which is modeled on acceptance of uncertainty, is strategic foresight - a more systematic and rigorous method of future planning. Adopting a strategic foresight process will allow PSE institutions to work within uncertainty while addressing

pressures of disruptive stress. Indeed, strategic foresight is viewed as a method to improve the sustainability of PSE institutions and regarded by some as a 'duty' of governance bodies of PSE institutions (see de Cagna, 2016). As noted by Weingarten, et al.:

The best sustainability regimes are those that look forward and are designed to predict future challenges. Sustainability analyses based on the current state only, or that look backward in time, are limited beyond serving as indicators of trends over time.

(Weingarten, Hicks & Moran, 2016)

While change is initiated by a variety of drivers and trends (demographics, urbanization, immigration, mobility of education, PSE-industry integration, etc.) the key to success will lie with the development of a coherent, focused and systematic strategy which takes full account of the realities of the future challenges facing PSE institutions. Environment scanning, as outlined above, is the initial and critical step in that process.

UOIT can be regarded as a positive example in exercising its "duty" of foresight through a framework of forward thinking embodied in the UOIT Futures Forum. The drivers and trends presented here are those, among others, that have been studied since 2014. Further, the Futures Forum has engaged with the Board of Governors in a process, albeit an abbreviated one, that examined the future UOIT within the global PSE environment. In addition, the Futures Forum has worked closely with Research Services in the creation of an annual Futures Forum program designed to harness the efforts of academia, government and industry in tackling future trajectories of collaborative and cooperative research efforts (i.e., Advanced Manufacturing and Smart Communities). Finally, the Futures Forum has designed and delivered educational curriculum with a view to potentially diffusing the practice of strategic foresight amongst the student body. While it is too early to accurately measure the salience of the Futures Forum's

body of work, there is little doubt that UOIT is a leader in adapting to the emergent PSE environment creating value through innovative capacity, situational awareness and perceiving and interpreting changes; indeed, exercising its duty of foresight. This duty began, and continues today, with scanning the contextual environment, a process that helps make sense of the future of PSE.

References

- Altbach, Philip G., Liz Reisberg and Laura E. Rumbley (2009). "Trends in Global Higher Education: Tracking an Academic Revolution - A Report Prepared for the UNESCO 2009 World Conference on Higher Education". Paris: United Nations Educational, Scientific and Cultural Organization.
- Bentham, Jeremy and Khoo Teng Chye (2014). "New Lens on Future Cities". Global Shell Centre for Liveable Cities Singapore. Retrieved from <http://s05.static-shell.com/content/dam/shell-new/local/country/sgp/downloads/pdf/new-lenses-on-future-cities.pdf>.
- Bishop, Peter C. and Andy Hines (2012). *Teaching about the Future*. New York: Palgrave Macmillan.
- Boker, Justin (2012). "University of the Future: A thousand-year-old industry on the cusp of profound change". Ernst & Young, Australia. Retrieved from [http://www.ey.com/Publication/vwLUAssets/University_of_the_future/\\$FILE/University_of_the_future_2012.pdf](http://www.ey.com/Publication/vwLUAssets/University_of_the_future/$FILE/University_of_the_future_2012.pdf).
- Brownlee, Jamie (2016). "The Role of Governments in corporatizing Canadian Universities". *Academic Matters*, January 2016. Retrieved from <http://www.academicmatters.ca/2016/01/the-role-of-governments-in-corporatizing-canadian-universities>.
- Camponovo, Giovanni, Jan Ondrus, and Yves Pigneur (2005). "Environmental Context Significance in Strategic Decision Support Systems". HEC School of Business, University of Lausanne. Retrieved from http://ceur-ws.org/Vol-144/09_ondrus.pdf.

- Choo, Chun Wei (1999). "The Art of Scanning the Environment", *Bulletin of the American Society for Information Science*. Vol. 25, No. 3, February/March 1999, 21-24.
- Contact North (2016). "A 2016 Look at the future of On-Line Learning". Retrieved from http://teachonline.ca/sites/default/files/toolstrends/downloads/2016_look_at_online_learning.pdf.
- Conway, Maree (2016). *Foresight Infused Strategy Development: A How-To-Guide for Using Foresight in Practice*. [Kindle version]. Retrieved from Amazon.ca.
- Cornish, Edward (2004). *Futuring: The Exploration of the Future*. Bethesda: World Future Society.
- Council of Ontario Universities (2015). "Growing Greener Campuses at Ontario Universities". Retrieved from <http://cou.on.ca/wp-content/uploads/2015/10/COU-Going-Greener-Report-2014.pdf>.
- Dator, James A (2002). *Advancing Futures: Future Studies in Higher Education*. Wesport: Praeger Publishers.
- de Cagna, Jeff (2016). "The Board's Duty of Foresight". *Associations Now*. Retrieved from <http://associationsnow.com/2016/02/boards-duty-foresight/>.
- Diamandis, Peter H (2016). "The Difference Between Linear and Exponential Thinking". Retrieved from <http://bigthink.com/in-their-own-words/the-difference-between-linear-and-exponential-thinking>.
- Dobbs, Richard, James Manyika and Johnathan Woetzel (2015). "The four global forces breaking all the trends". McKinsey Global Institute. Retrieved from <http://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/the-four-global-forces-breaking-all-the-trends>.

Habegger, Beat (2010). "Strategic foresight in public policy: Reviewing experiences of the UK, Singapore, and the Netherlands", *Futures* 42.

Hardt, Robert (2015). "Keynote Presentation". The President's Futures Forum: The Future of Advanced Manufacturing, Oshawa, ON, April 16.

Harris, Peter (2014). "How Many Jobs do Canadians Hold in a Lifetime?". *Workopolis* (blog).

Heijden, Kees van der (2010). *Scenarios: The Art of Strategic Direction*. West Sussex: John Wiley and Sons Ltd.

Hornsby, David J. and Rusana Osman (2014). "Massification in higher education: large classes and student learning". *Higher Education*. June 2014, Volume 67, Issue 6: 711–719.

KPMG International (2013). "Future State 2030: The global megatrends shaping governments".

Retrieved from

<http://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/future-state-government/Documents/future-state-2030-v3.pdf>.

Merisotis, Jamie P (2015). "Higher education must change to reflect shifting student demographics". *The Hill*. Retrieved from <http://thehill.com/blogs/congress-blog/education/228795-higher-education-must-change-to-reflect-shifting-student>, 2015.

Miller, Riel (2001). "21st Century Transitions: Opportunities, Risks and Strategies for Governments and Schools". *OECD Schooling for Tomorrow*.

Retrieved from

<https://www.oecd.org/site/schoolingfortomorrowknowledgebase/futuresthinking/trends/41286179.pdf>.

Nye, J.S (2002). *The Paradox of American Power*. Oxford: Oxford University Press.

- Ontario Confederation of University Faculty Associations (2016). "Access to what? OCUFA analysis of the 2016 Ontario Budget". Retrieved from <http://ocufa.on.ca/assets/Post-Budget-Analysis-2016-FINAL.pdf>.
- Ontario Government (2016). "Ontario Budget 2016, Jobs for Today and Tomorrow, Improving Access to Postsecondary Education, Ontario". Retrieved from <http://www.fin.gov.on.ca/en/budget/ontariobudgets/2016/bk1.pdf>.
- Press, Jordan (2012). "Canada Census 2011: The cities leading Canada's population boom", Retrieved from <http://www.nationalpost.com/m/news/blog.html?b=news.nationalpost.com/2012/02/08/canada-census-2011-see-which-cities-and-towns-have-grown-the-most>.
- Prince, Katherine, Jason Swanson, and Andrea Saveri (2016). "The Future of Learning: Education in the Era of Partners in Code". *KnowledgeWorks*. Retrieved from <http://www.knowledgeworks.org/future-forecast-4>.
- Ramirez, Rafael (2014). "Introduction to scenarios and the 'Oxford Approach' to scenarios". Presentation - Oxford Scenarios Program, Oxford University, Oxford, UK, September.
- Ramirez, Rafael, John W. Selsky, Kees van der Heijden (2010). Eds. *Business Planning for Turbulent Times: A New Methodology for Applying Scenarios*. Oxfordshire: Earthscan.
- Rasmus, Dan (2012). "Why Higher Education Needs Scenarios", *University Business*. Retrieved from <http://www.universitybusiness.com/article/why-higher-education-needs-scenarios>.
- Rohrbeck, René and Jan Oliver Schwarz. (2013). "The value contribution of strategic foresight: Insights from an empirical study of large European companies", *Technological Forecasting & Social Change*, Volume 80, Issue 8, 1593-1606.

- Sattler, Peggy and Julie Peters (2011). "Work-Integrated Learning in Ontario's Postsecondary Sector". Toronto: Higher Education Quality Council of Ontario.
- Sayers, Nicole (2010). *A Guide to Scenario Planning in Higher Education*. London, Leadership Foundation for Higher Education.
- ISSThinkTank* (2016). "STEEP Analysis". Retrieved from <http://issthinktank.wikispaces.com/STEEP+Analysis>.
- Waverley Management Consultants (2006). "Scenario Planning Toolkit". Retrieved from <http://www.destinationworld.info/newsletter/feature47/Scenario%20Planning%20Toolkit.pdf>.
- Statistics Canada (2015). "Canada's population estimates: Age and sex, July 1, 2015". *The Daily*, September 29.
- Statistics Canada (2008). *Canadian Demographics at a Glance*. Retrieved from <http://www.statcan.gc.ca/pub/91-003-x/91-003-x2007001-eng.pdf>.
- Statistics Canada (2011), "2011 Census Summary Tables". Retrieved from <http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/demo62g-eng.htm>.
- Statistics Canada (2016). *Canadian Demographics at a Glance*. Second Edition. Retrieved from <http://www.statcan.gc.ca/pub/91-003-x/91-003-x2014001-eng.htm>.
- The Canadian Chamber of Commerce (2014). "A Battle We Can't Afford to Loose: Getting Young Canadians from Education to Employment". Ottawa: Canadian Chamber of Commerce.
- "Thync". Retrieved from <http://www.thync.com/>.

- Trow, Martin (2000). "From Mass Higher Education to Universal Access: The American Advantage". Research and Occasional Paper Series: CSHE.1.00, University of California, Berkley. Retrieved from <http://www.cshe.berkeley.edu/sites/default/files/shared/publications/docs/PP.Trow.MassHE.1.00.pdf>.
- United Kingdom, Ministry of Defence (2014). "Global Strategic Trends - Out to 2045". 5th Ed. London: Ministry of Defence UK, 2014.
- U.S. Department of Education Office of Educational Technology (2010). "Transforming American Education National Education Technology Plan 2010". Retrieved from <http://www.ed.gov/technology/draft-net-2010/individualized-personalized-differentiated-instruction>.
- Weingarten, H.P., M. Hicks, and G. Moran (2016). "Understanding the Sustainability of the Ontario Postsecondary System and its Institutions: A Framework". Toronto: Higher Education Quality Council of Ontario.
- Wilson, Duncan, Marcus Morrell, and Josef Hargrave (2012). "Campus of the Future", Arup Foresight Innovation+ Incubation 2012. Retrieved from <http://www.driversofchange.com/make/research/livingworkplace/>.
- United Nations (2014), "World Urbanization Prospects: The 2014 Revision, Highlights". Retrieved from <https://esa.un.org/unpd/wup/Publications/Files/WUP2014-Highlights.pdf>.
- UOIT (2014). "2013-2014 Report Back to Ministry of Training, Colleges and Universities". Retrieved from <http://www.uoit.ca/sites/oira/acountability/UOIT%20MYAA%20Report%20Back%20FINAL%202013-2014.pdf>.