Higher Education Harmonization with the DPRK

By

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Introduction

International educational exchange is the most significant current project designed to continue the process of humanizing mankind to the point, we would hope, that men can learn to live in peace—eventually even to cooperate in constructive activities rather than compete in a mindless contest of mutual destruction....J. William Fulbright, remarks on the thirtieth anniversary of the Fulbright Program, 1976.

This paper focuses on ways to facilitate enabling the Democratic People’s Republic of Korea (DPRK or North Korea) higher education to become more integrated into global education networks. My approach is conditioned by my experiences and in this sense is more personal than a typical scholarly essay. So, some background is in order. First, I am not a Korea scholar. However, I have participated in development of academic exchanges between Syracuse University and the Republic of Korea, the People’s Republic of China, countries of the former Soviet Union, Vietnam, and, most recently, DPRK. My presentation here will focus on suggestions for steps which can be initiated now that will lead to better harmonizing DPRK higher education with education systems such as that of the U.S. in the future. It is a matter for discussion as to how much relevance this might have for North/South higher education integration.

My research focus has been on the impact of information technology on governance and politics. In this regard it has become apparent to me that leading universities are increasingly national entities and are ever more becoming linked together in diverse and still poorly understood global networks. An implication is that, once in those networks, universities are no longer completely governable as purely campus or national resources.

Many years ago I was employed doing policy planning forecasts for the coordinating board of the state colleges of Minnesota. There I quickly learned that higher education policy and reform can only at great peril be considered in isolation of K-12 education. This has the implication that higher education
planning (and reform) is generally a process with very long lead times. What you are doing with your five-year olds to a very significant extent constrains or enables what your university environment can look like twelve years later. Finally I have a normative commitment to the power of ideas. I believe that ideas matter and that much of what we call progress results from the interplay of often conflicting ideas. One of the most powerful playing fields for these ideas has been, I believe, relatively open universities. While this may seem merely platitudinous, it has, I believe, clear policy implications, especially when considered in the context of earlier points. Among these implications is the argument that educational exchanges—especially among peoples with diverse ideas and backgrounds—is a good thing. Particularly it is a good thing since both parties to the exchange stand to benefit. In this sense, educational exchanges are not simply disguised technology (and here I use technology in a very broad sense) transfers from the rich to the poor. Rather they are at the very core of what is needed to constantly enrich and expand our intellectual ecosystem.

In terms of suggestions regarding DPRK higher education, the paper argues for several recommendations. I shall simply list these here and provide supporting evidence and argument in the sections that follow. First, given the long-range requirements for educational planning the U.S. Government (USG) should, as soon as is practicable, enter into sincere discussions with counterparts in the DPRK to establish meaningful and sustained educational exchanges between the U.S. and the DPRK. Second, the USG should move forward with a number of policy proposals already under consideration[19] to modify outdated export control regulations to reduce the difficulty of educational exchanges with the DPRK (and other countries). Third, it is important to recognize that global university networks are simultaneously physical and virtual. The exchange of people depends upon harmonized (and this is not the same as homogenized) understandings of everything from university calendars to notions of credit hours.
and transcripts. To this end it would be extremely helpful for collaborative teams of DPRK academics and those from other countries to work toward developing a culturally meaningful concordance of academic terms. The shared understandings implicit in the creation of such a concordance would facilitate everything from exchange of university records to exchange of students and faculty and sharing of library and other research materials. Fourth, if DPRK wants to participate in the rapidly growing global networks of universities, it must consider ways to permit increasing access to the global Internet. Here, again, U.S. policy should not discourage greater DPRK Internet involvement. The paper concludes by arguing that, to a very large extent, these suggestions are interdependent. Making significant progress on any one will require some success on the others.

**Higher Education in the DPRK**

Perhaps the most fundamental thing to understand about North Korean higher education is that it is Korean. That is, while the organizational and administrative structures are somewhat distinctive to the DPRK (though in many ways derivative from those of the former Soviet Union), the Korean/Confucian respect for and valuing of education predates the current separation of the peninsula into North and South. The Confucian heritage includes a strong tilt toward achievement-based recruitment for public service—which traditionally meant any “career” pursued outside the household. Moreover, the modern (i.e., Western-style) educational system was introduced into Korea in tandem with the abolition of the traditional (i.e., Chinese-style) examination system that for more than a millennium was the only route to public (in the above comprehensive sense) service. Hence—I think in the North as in the South—for Koreans, educational achievement meant passing the civil service examination which implied a lifelong career ensuring honor, income, self respect, and sense
of being right with world. Education, both social and technical, is extremely important in the DPRK and this makes the current humanitarian crisis where it is reported that many young students, especially in the provinces, are staying away from school due to lack of food especially troubling with regard to the long term.

To my knowledge the major universities in the North include Kim Il Sung University (by most accounts the most prestigious one), Pyongyang University of Foreign Studies (focus on languages and training of diplomats), and Kim Chaek University of Technology (KCUT; emphasis on engineering and computer science). There are a also number of medical schools and agricultural universities though I have not visited them. These universities are, I believe, under the Ministry of Education.

In addition, the State Academy of Sciences (SAOS) operates the University of the Sciences. According to, the Academy was originally formed during the Korean conflict in 1952. From what I have been able to learn, SAOS is patterned on a Soviet model and operates as a sort of super ministry. Thus the University of Sciences does not fall under the Ministry of Education. The University of Sciences offers the Ph.D. degree and appears to have a very strong mandate to identify and ultimately recruit high potential students from middle schools around the country. Interestingly, the identification does not depend only upon standardized tests but also involves sending senior university scientists out to meet with students. The admissions recommendations of these scientists can trump low test scores. This seems to be an area where a very serious attempt is being made to identify potential for creativity as well as the ability to learn basic principles.

More recently SAOS has been charged with playing a lead role in the development of information technology especially as it relates to the modernization of the DPRK economy. In this regard, University of Sciences professors have been quite active in collaborating with foreign institutions. Though so far there
has been no such collaboration with a U.S. university.

One of the most interesting universities is also the newest—the Pyongyang University of Science and Technology (PUST). This summer PUST enrolled 40 graduate students (all graduates of Kim Il Sung or KCUT). They are all taking English language courses. In September 100 undergraduate students and about 20 graduate students are anticipated and they will be taking courses in English and basic science subjects. PUST, as its name suggests, will be primarily focused on science and technology. Unlike KCUT, this will be a residential campus with course instruction taking place in both Korean and English. Faculty will be drawn from all over the world including South Korea and the U.S. PUST is chartered by the DPRK Ministry of Education. Campus facilities are all new and classrooms and computer labs are designed and equipped to world standards. PUST officials expect that students will be granted wide-ranging access to the Internet. The only comparably modern higher education facility I have seen in DPRK is the new digital library building at KCUT. PUST is an entire campus of such buildings.

Those working with the DPRK often comment on the rather extreme stovepiping of DPRK bureaucracy. For example, officials at the University of Sciences seemed largely unaware of what was happening at universities under the Education Ministry. When I visited PUST, the several SAOS officials accompanying me said it was the first time they had been on the PUST campus and they appeared to find the tour as interesting as did our delegation from the U.S. Not surprisingly, the organization of U.S. universities with its odd admixture of public and private support appears quite opaque to DPRK academics (and to many U.S. academics as well!). Nonetheless, a consequence of the tight vertical flow of information seems to be that there is less cooperation and resource sharing between North Korean universities than what is the case in the U.S. or South Korea.
Evolving Structure of Higher Education with Implications for DPRK

Benkler provides a compelling description of what he terms the networked information economy which much of the developed world is beginning to inhabit. He argues that this is characterized by the increasing consumption of decentralized and often nonmarket produced high information content goods. It is worth unpacking this claim a bit to see its implications for higher education in general and for DPRK higher education in particular.

First, high information content goods are those in which the material components are low relative to the information component. A simple example is a daily newspaper. In printed form it is comprised of the physical ink and paper together with the actual text. In electronic form, say on a web site, the ink and paper are no longer required and the text exists, at least to the consumer, as ephemeral pixels on a reusable (and re-purposable) electronic display. This is, of course, a gross simplification. Behind the physical newspaper lay big mechanical printing presses and an energy consuming (and pollution emitting) distribution and recycling system. Behind the electronic newspaper is an expensive network infrastructure (for distribution) and high cost mechanisms for gathering, preparing, sharing, storing, and displaying the news. However, once shared digitally others can combine the news in ways that go way beyond those envisioned by the initial producer of that news. So we now have news aggregation sites such as Google News, Yahoo, Huffington Post, and Naver that index and make available news from a wide variety of sources. And this process feeds on itself so that we now have new sources of (arguably) news such as blogs and Twitter.

Some use the term disintermediation to refer to the process through which the power of previously central entities becomes decentralized. In this sense it is argued that e-commerce is disintermediating traditional brick and mortar
operations. The decline, at least in the U.S., of traditional newspapers and local bookstores provides stark evidence of the simultaneous impacts of the increasing information value of goods and decentralization and disintermediation of their production.

Along with this comes the fact many of these goods are being created outside the traditional industrial information economy. High quality software such as Linux is being produced and given away freely to all who can afford the initial cost of the physical devices required to run it. More and more books are freely available to anyone connected to the Internet. And one study found the noncommercial peer-produced Wikipedia to rival the quality of commercially produced print encyclopedias.

Universities are not immune to the effects of disintermediation. University faculty members and students have long physically moved to where the knowledge environment seemed most compelling. In the latter half of the past century this movement was accelerated by initiatives such as the Fulbright Program. One of the countries where Fulbright has had the greatest impact has been South Korea where, arguably, the entire structure and organization of higher education has been driven by scholars with Fulbright experience. Beyond that, the Fulbright English Teaching Assistant program, initiated in 1991 by then Korea Fulbright program (Korean-American Educational Commission) executive director Fred Carriere has helped to develop English competency in South Korea and enabled many U.S. young people to become familiar with Korea.

One reason the Fulbright program has been so successful is that it supports extended stays for exchange scholars. This is very important since, as most who have worked with exchange programs would attest, it generally takes a minimum of several months to begin to develop an empathetic understanding of a new culture. Once such understanding sets in it becomes possible to see
how culturally new ideas might be adapted to one’s own environment.
South Korean Fulbrighters have long expressed the hope that the Korean Fulbright program would extend to the entire peninsula. At the 50th anniversary celebration of Fulbright in Korea, they wrote, “We firmly believe that 50 years in the future, when Fulbrighters in Korea celebrate their centennial anniversary, a united Fulbright program will be promoting the mutual understanding of peoples between the United States and a united Korea.” This sentiment was reiterated in public remarks this year by Shim Jae Ok, the current KAEC executive director, at a celebration in Washington D.C. marking the 60th anniversary of the Korea Fulbright program.

It is important to emphasize that these exchanges do not merely benefit those directly involved. There is a multiplier effect when people bring ideas from different cultures back to their own and this effect is further amplified when the people are teachers. Sometimes these effects take the form of access to new ideas and literatures and other times they may involve new practices and designs. So, for example, the DPRK does send its faculty and advanced students abroad for training and research and, as elsewhere, those experiences have helped shape the nature of North Korean higher education.

Since many senior DPRK academics have had experiences in the former Soviet Union and Eastern Bloc countries (as well as China) it should not be surprising that DPRK higher education shares some similarity with that of the Soviet Union. However, as DPRK academics’ experiences broaden, so do the contours of their education environment begin to change. For example, the recently constructed digital library facility on the KCUT campus appears to have adapted design features their academic leaders experienced when visiting the Tae-Joon Park Digital Library at Pohang University of Science and Technology and the Global Collaboratory at the Syracuse University’s Maxwell School. The new PUST campus in Pyongyang embodies advanced academic architec-
tural features and could be comfortably placed pretty much anywhere in the academic world.

Yet another example is the adoption by the KCUT digital library of the Dublin Core for encoding information about the contents of their library. When we first started meeting with KCUT officials they were planning to use a unique encoding system (and associated proprietary software) developed in the DPRK. After seeing some of the advantages of conforming to global standards they decided to switch to the Dublin Core and open source software. Their digital library is now in a position, with the appropriate Internet connections, to share data with other digital libraries around the world. So the question is not whether these exchanges affect scholarship and practice. On this the evidence is about as clear as such things ever are.

In the current networked information age, academic cooperation is not limited to exchange of people. Even relatively poor countries can have access to shared digital library resources. For example, a project led by the U.S. Civilian Research and Development Foundation has jump started provision of a virtual science library available to Iraqi universities. This digital networks are transforming ways universities share resources and provide access to education. For example, consortia of universities are now making course syllabi and lecture notes freely available on the web. These materials are available at no additional cost to anyone with an Internet connection and a web browser. South Korea has a consortium of 12 universities, including Hanyang University and Korea University, which share materials in this manner. This opens, at least in principle, Korean as well as English language materials to DPRK scholars. However, without easy access to the Internet accessibility will remain quite limited.

As universities become increasingly networked, the nature of universities, not surprisingly, changes. The network slowly becomes the university. This
imagined future has led Bill Gates to recently predict that “place-based” colleges will be much less important (except as a venue for parties!) in five years. While this statement clearly is hyperbole that underestimates the unique dimension of person-to-person mentorship (not just merry-making) that always has and most likely will continue to underpin the concept of a university, the extension of the mentorship dimension into virtual space is undoubtedly part of the unfolding reality of universities today and can only become a more significant feature in the future.

One thing that has been learned studying networks is that their growth often follows the path of a power law. This gives rise to a phenomenon sometimes termed the rich get richer denoting that elements in the network grow exponentially in accord with their size. Components which are initially big get larger faster than do initially smaller components. This is used to explain, for example, the distribution of the sizes of web sites where there are a few very large ones (such as Google) and a large number of very small ones (such as my own). The distribution of city populations is also captured by a power law. It follows that the earlier one enters a network the greater, ceteris paribus, the chances that one will become large in that network. Thus timing is important and the longer it takes for DPRK universities to join the various networks, the more difficult we would expect it to be for them to become fully integrated into them.

Working with a DPRK University

The Kim Chaek University of Science and Technology (KCUT)-Syracuse University (SU) relationship began in late spring 2001 when SU faculty and administrators, with participation and counsel from The Korea Society, began discussing with DPRK UN mission representatives the possibility of joint academic science engagement in the area of information technology. These initial
talks ultimately led to establishment of bilateral research collaborations between KCUT and SU in the general area of information technology.

KCUT focuses on science and technology although it offers coursework in a wide range of areas in its role, along with Kim Il Sung University, as a lead comprehensive university in North Korea. Each university has supplied a team of researchers. The interdisciplinary SU team involved scholars from the Maxwell School, the L.C. Smith College of Engineering and Computer Science, and the School of Information Studies as well as the Systems Assurance Institute, the English Language Institute, and the University Library. The director of KCUT’s Information (Computer) Center has been the KCUT team leader. The KCUT-SU relationship has, with generous support from the Henry Luce Foundation, gone through several phases. The first centered on North Korea’s first digital library, located at KCUT. The primary research focus was modifying open-source software for use as back-end support in the library and identifying appropriate international standards for use in categorizing information held in the library. The impact of this is indicated not only by the physical construction of KCUT’s library (done with DPRK resources) but also the fact that Kim Il Sung University is now about to open their digital library, the University of Sciences is nearing ground-breaking on its first digital library and the Yongbyon science facility now has a digital library. In meetings with SAOS last December, we were told that these libraries were, with the possible exception of the one at Yongbyon, all patterned after the KCUT facility.

The second phase, the Regional Scholars and Leaders Seminar (RSLS) program, enlarged participation to include China and South Korea in addition to North Korea and the United States. The RSLS sessions were held in Beijing and emphasized information sharing and developing language and presentation skills necessary for participating in international scientific meetings.

The third phase involved North Korean undergraduate teams of computer
scientists participating in the Association for Computing Machinery (ACM) annual International Collegiate Programming Contest. This was the first time North Korean teams had participated in this international science competition. Importantly, this competition was done in English and held via the Internet. SU brought the DPRK teams to Beijing for last-minute training and the ultimate competition (there is still not general access to the Internet in North Korea). The fourth phase was the development of a Junior Faculty Leadership and Development program to bring young DPRK faculty to the U.S. for extended (one semester) stays designed to both support academic research collaboration with U.S. counterparts and to expose them to a variety of U.S. universities as well as the ways in which those universities are organized and administered. Several years ago this program was set to go with funding in place when geopolitical events led to an unwillingness by the DPRK to send faculty to the U.S. for a full semester. We are now restarting this initiative with DPRK concurrence and once new funding is identified hope to begin it, albeit with shorter than a full semester stay, within the year. It should be noted here that the DPRK has sent students and faculty to other countries, including Western ones, for extended stays and even degree programs. The issues here with regard to the U.S. are many but, I believe, cannot be separated from the lack of official diplomatic relations between the two countries.

The fifth phase saw the establishment of the U.S.-DPRK Scientific Engagement Consortium aimed at expanding collaborative academic scientific activities between the two countries. Founding members of the Consortium are the American Association for the Advancement of Science (AAAS), the Civilian Research and Development Foundation, Syracuse University, and The Korea Society. With the support of the Richard Lounsbery Foundation and at the invitation of the DPRK State Academy of Sciences, the Consortium last December sent a six-person delegation to Pyongyang. This delegation was led by Peter Agre, a 2003 Nobel Laureate in Chemistry and then president of AAAS.
Consortium Meetings with SAOS

In December 2009, the Consortium delegation visited Pyongyang hosted by the DPRK State Academy of Sciences (SAOS). The schedule included virtually all meeting requests that had made as a part of preparing for the trip. During meetings, which were quite substantive, members of the delegation explained the purpose of the visit and underscored envisioned benefits of long-term academic science engagement for both countries.

In addition to meeting with the various Branch Academies of SAOS (focusing on such areas as Biology, Cell and Genetic Engineering, Hydraulic Engineering and Thermal Engineering) the delegation met with scientists from SAOS’s University of Sciences. This university was founded in 1967 and we were told we were the first U.S. delegation to visit there. The university has 5,000 students and 150 PhD.s and professors in seven departments including physics, chemistry, biology, computer science, electronics, and English language. The University of Sciences was one of the universities sending undergraduate teams to participate in the ACM computer programming contest. University officials said that they viewed international science cooperation as being very important. So far most all of that cooperation has been with former Soviet-allied countries (Russia and Germany in particular) and selected countries in the region including China.

The Russia and Germany focus reflects the fact that many senior DPRK scientists received advanced training there and generally speak Russian and/or German in addition to their native Korean. English training is an integral part of the university.

Several university scientists, both junior and senior, gave brief presentations on their research in English. Areas covered included (using their descriptive titles):

• Mathematics and the greatest math problem;
• Protein Structure Prediction;
• High Temperature Superconductivity;
• Laser Plasma Systems Project;
• Microbiology, digestibility of animals;
• Time series predicting;
• Computer architecture;
• Nano materials;
• Transgenic and transgenic bean; stem cell isolation and culture;
• Chaotic networks; and
• Stock market pricing.

On the final day a formal written cooperation agreement was drafted between the Consortium and SAOS. The agreement was ultimately approved by Pyongyang and delivered to the Consortium by representatives from the UN Mission in New York for signatures at the AAAS Annual Meeting this past February. The first step in implementing the agreement will be an invitation from the Consortium to the SAOS to send a reciprocal delegation to the U.S. to learn more about our university science capabilities and priorities. Planning has begun for this visit and we anticipate receiving a DPRK science delegation sometime in the next six months.

The Consortium expects to launch a series of initiatives in the coming months aimed at exploring concrete ways of promoting scientific engagement with the DPRK. A key such initiative will be sending, in collaboration with the American Association of Universities (AAU), a delegation of AAU presidents to meet with counterparts in the DPRK. Financial support for this has been provided by the Henry Luce and Richard Lounsbery Foundations. The DPRK has agreed to host the delegation though precise timing will depend, to a large extent, upon the larger geopolitical environment.

Conclusion: Creating the Future
Our future is not in the stars but in our own minds and hearts.

Creative leadership and liberal education, which in fact go together, are the first requirements for a hopeful future for humankind.

In this brief paper I have provided a rather personal overview of higher education in the DPRK. In doing so, I hope to have, at a minimum, cast doubt on the commonly received, at least in the U.S., view that DPRK higher education is completely cut off from the world. Rather, DPRK scholars do have limited exposure to the larger world of higher education and there is good evidence that when that exposure occurs, organizational and practice changes frequently result.

If Yogi Berra were to write about higher education (and it matters not in what geographic context his writings took place) he would almost certainly observe that change in higher education takes longer than it takes. Ideas, be they technical or social, often take decades and even centuries before they become integrated into our educational fabric. The reasons for this are many and largely beyond the scope of this paper. However if this claim is accepted it follows that those of us who would like to see a more fully harmonized global system of higher education (and by implication those who wish for a Korean higher education whose form is not fully characterized by its position relative to the 38th parallel) have some work to do and, given the lag times, that work must begin as soon as is feasible. In this regard I return to the suggestions offered in the Introduction.

First, efforts should be made to encourage longer term faculty, and ultimately student, exchanges between the DPRK and the U.S. A practical goal here should be to realize the Korean Fulbrighter’s hope for a peninsula-wide Fulbright program. However, political realities might make a named and USG funded Fulbright program difficult in the U.S. and the Koreas at this point. So, as an initial step private funding should be identified which could support a
Fulbright-like effort in the hopes that the political atmosphere would eventually make a full Fulbright program possible. Such a program would provide future academic leaders in the North a window on educational systems that are quite different than their own. And, I suspect that this would provide a softer and perhaps more palatable introduction to these differences than if they were initially to have similar exchanges with the South.

Second, if such exchange programs were to move forward they would quickly run afoul of the industrial age export control regime of the U.S. Simply put (and this is a hideously technical area where anything preceded with simply put will be an egregious distortion of reality), serious and sustained academic exchange with the DPRK at present requires extremely expensive legal oversight to ensure that programs do not unintentionally run afoul of export control restrictions.

In the most basic case this means that equipment sharing will generally require a costly export license. More subtle are the deemed export restrictions which make even talking about many technical topics problematic unless the substance of that discussion can be shown to already be in the public domain and not otherwise in violation of regulations. Moreover, these regulations are often subject to reinterpretation and thus provide a chilling context antithetical to the trust building so critical to any serious sustained academic exchange.

It is tempting to argue that these controls are necessary for national security. And perhaps some are. However, it is also important to note that open collaborations (of a sort that would almost certainly run afoul of current deemed export restrictions) among working scientists characterized relationships between Soviet and U.S. academic scientists during the Cold War. Indeed, Caltech Feynman Professor Emeritus (theoretical physics) Kip Thorne who participated in many such exchanges has suggested that these played an important role in the peaceful ending of the Cold War. Finally, much equipment falling under these controls is easily available for purchase throughout China and is present at the
DPRK universities and technical institutes I have visited. Bottom line here is that I believe we should move toward policies which facilitate the free flow of ideas. If we evince fear of the spread of ideas we should not be overly surprised when those with whom we disagree do the same.

Third, academic exchanges are the tip of an iceberg comprised of many academic procedures, legal agreements, regulations, and understandings. If these are not attended to, relationships will fail. Included here is everything from visas, housing, health insurance, food, and banking to the evaluation of transcripts, coordination (and even definition) of credits, and types of degrees.

One way of beginning to build trust would be to work collaboratively on a web-based culturally empathetic concordance of DPRK, U.S. and ROK academic terms and regulations. The ongoing construction and refinement of such a concordance would be useful to participants (we completed a similar project with the first waves of post-Soviet scholars coming to Syracuse) and, importantly, the result would be useful to all those thinking about participating in exchanges.

Fourth, Internet connectivity, as was argued above, is becoming increasingly central to a university participating in the world of education. It is a positive sign that DPRK now has its own country code top-level domain (.kp).

Within DPRK there is a widely used academic internet (I believe managed under SAOS). This means that DPRK students are familiar with the use of web browsers and the use of web resources. However this internet is a “walled garden” isolated from the larger Internet. At the same time the capacity to connect to the Internet is present (reporters covering the New York Philharmonic concert in Pyongyang were able to access the Internet from the KCUT library as well as at a state-of-the-art media center set up for their use at the hotel where the press and most members of the New York Philharmonic delegation were staying.). As argued above, modern research universities simply cannot afford to be isolated from the dynamism of the web. In this regard, the apparent official
agreement to permit PUST students fairly open web access is a positive sign. More generally, I hope that the DPRK will engage in more academic projects involving Internet-based collaboration and that USG policy will encourage such connectivity (and this relates back to current export control policy).

Finally, I have found the DPRK scholars with whom I have worked to be serious, skilled, and sincere. They are eager for collaboration and are as curious about how our universities are organized for the multiple purposes of teaching, research, and community service as I am about theirs. They are quite open about their own universities. That there are not more links between our universities is a sad loss to all involved. The longer this remains the case, the more difficult it will be to remedy the situation and I hope that the suggestions I have made are helpful as starting points for generating and implementing responses to this unfortunate and, ultimately costly, situation. If we want a better future we must all work to create it.