

Security Challenges in the 21st Century: The Changing Nature of Risk, Security and Sustainability

Glenn Pierce^(✉), Paul Cleary, Curtis Holland,
and Gordana Rabrenovic

Northeastern University, Boston, MA, USA
g.pierce@neu.edu

Abstract. Security concerns facing the United States today are broader and more complex than at any time in our history. They range from concerns arising from threats to systems that allow society to control intergroup and interpersonal conflict to more recently recognized concerns associated with threats to social and economic systems, and threats to the natural/environmental systems on upon which society depends. Each major type of threat represents a form of “fat-tailed risk,” where extreme consequences are far more likely than expected but possess significant uncertainty regarding their severity and timing. Each type of threat shares the common characteristic that some elements are non-negotiable because they contain requirements that society must address to avoid or suffer irreparable consequences. Based on these assessments, we discuss the implications of societal threats on the development of global institutions, cooperation, social justice and human rights.

Keywords: Security · Fat-tail risk · Conflict economic systems · Social systems · Climate change · Environmental systems

1 Introduction

The security challenges facing the globe today are far more complex and interrelated than at any point in our history. Evidence suggests that as intergroup and interpersonal conflict has begun to recede, there has been a corresponding escalation of other, less understood known threats including threats to the natural, economic and social systems we have developed upon which society depends. This paper examines some of the differences, commonalities, and interconnections that exist among the major types of societal risk. Each of these dimensions adds to the complexity of threats facing society, but also creates the potential for developing integrated strategies that produce multiplicative returns on societal investments and initiatives. The paper will also examine the extent to which we are entering into a post-Nash Equilibrium context where society must meet externally imposed requirements for reasonably sustainable development.

2 Intergroup and Interpersonal Conflict: Successes

Recent scholarship has convincingly argued that intergroup and interpersonal violence has declined exponentially since the era of Enlightenment, reaching an all-time low at the turn of the twenty-first century. Despite accounts of the threat of Islamic terrorism, urban homicide and other violence, systematic analysis of data on rates of violence over time suggests that “today we may be living in the most peaceable era in our species’ existence” [1, p. xxi]. These developments are in sharp contrast to past history. Before the onset of the Enlightenment and development of the nation-state, existence was brutal, short and violent for most. During the Medieval Ages in Europe, for example, “States were ineffectual, and the king was merely the most prominent of the noblemen, with no permanent army and little control over the country. Governance was outsourced to the barons, knights, and other noblemen who controlled fiefs of varying sizes, exacting crops and military service from the peasants who lived in them” [1, p. 67].

However, along with the development of the nation state, over the last 600 years, there has been a huge decline in both interpersonal and intergroup violence in Europe. From “the 13th century to the 20th, homicide in various parts of England plummeted by a factor of ten, fifty, and in some cases, a hundred” [1, p. 60]. In 14th century Oxford, there were 110 homicides per 100,000 people; in mid-20th-century London, there was less than one homicide per 100,000 [2, pp. 303–313]. Research by Eisner [3] similarly shows a massive decline in homicide in five Western European countries between the 14th and 21st centuries. Over an even longer time span, the overall homicide rate for much of human society declined from “triple-digit values” (i.e., homicides per 100,000) for pre-state societies and double-digit values for medieval Europe [1, p. 87] to worldwide homicide rates of under 10 per 100,000 as based on WHO estimates in 2000 [4].

On an international level, society has become increasingly effective in its commitment to peacekeeping operations since the 1980s and allocated greater resources to peacekeeping initiatives. Moreover, according to research by Fortna [5], the presence of peacekeepers in a society transitioning from conflict reduced the risk of a re-escalation of intergroup conflict by 80 percent. The reasons for the effectiveness of such interventions are at least threefold. Firstly, strong peacekeeping forces can directly respond to violence by a violating regime. Secondly, the process of facilitating an agreement through the presence of international forces can act to appease non-state actors by granting them acknowledgment as political leaders [5]. Thirdly, “The very act of accepting intrusive peacekeepers is a costly (hence credible) signal that each side is serious about not attacking.” [1, p. 315]. The progress identified in these assessments, however, is at least partially mitigated, by the emergence of significant civil conflicts in the Middle East over the last five to ten years.

The most impressive effort to control violence over the last 70 years has been the world’s success in avoiding the existential threat of nuclear war between major powers. This achievement has been accomplished by the development of international and bilateral agreements that have greatly reduced the risk of major power nuclear war. These agreements include the 1968 Non-Proliferation of Nuclear Weapons Treaty, the Strategic Arms Limitation Talks (SALT) of 1972 and 1979, the Strategic Arms

Reduction Talks (START) a decade after SALT, and most recently the Joint Comprehensive Plan of Action (JCPOA) commonly known as the Iran nuclear deal [6]. However, it was also achieved through an emerging recognition that nuclear meant mutual assured destruction or MAD [6].

These remarkable reductions in interpersonal and intergroup violence have been attributed to a set of parallel developments. As argued by Pinker [1], five major developments helped societies become less violent. They include the development a Hobbesian Leviathan state, possessing a judiciary with a monopoly on the legitimate use of force and norms and institutions that enabled societies to defuse the temptation of exploitative attacks, inhibit impulses for revenge, and circumvent the self-serving biases that of parties in conflicts. The emergence of commerce as technological progress increasingly supported the exchange of goods and ideas over longer distances and among larger groups of trading partners. In such a positive-sum game where increasing numbers of people could win, other people become more valuable alive than dead, and as such, they are less likely to become targets of demonization and dehumanization. The development of cultural norms that respect the interests and values of women and empower women help societies move away from the glorification of violence, and are less likely to breed dangerous subcultures of rootless young men. Increasing cosmopolitanism through literacy, mobility and mass media can prompt people to take the perspective of people unlike themselves and to expand their circle of sympathy to embrace them. In addition, an intensifying application of knowledge and rationality to human affairs can help people recognize the futility of cycles of violence, ramp down the privileging of their interests over others', and reframe violence as a problem to be solved rather than a contest to be won [1].

From a game theoretic perspective, the developments identified by Pinker [1] and others can be thought of as societies developing sets of institutionalized Schelling points, which he describes as "focal point[s] for each person's expectation of what the other expects him to expect to be expected to do" [7, p. 57]. Here we are referring to societal values, norms, agreements, laws, and institutions as focal points that act as agreed upon and often enforceable guideposts for highly complex and dangerous interactions. These institutionalized guideposts have provided mechanisms for addressing violence and conflict as societies had come to understand them by the end of the 20th century. However, these are not simply lessons of the past, nor is this discussion limited to a dialogue on conflict and violence. As new threats emerge, whether they be in the field of conflict, economy, natural/environmental systems or beyond, society can learn from these past successes and develop and implement new Schelling points (e.g. values, laws, institutions) to confront emerging societal threats.

3 Intergroup and Interpersonal Conflict: Emerging Threats

Despite the past advances in addressing conflict, rapid technological developments are emerging that may greatly exceed the ability of established societal values, norms, laws and institutions to reduce or even control violent conflict. James Clapper, the former U. S. Director of National Intelligence (DNI) in his testimony to the Senate Armed Services Committee on the Worldwide Threat Assessment of the US Intelligence Community

(February 9, 2016), outlined how technological advances can put at risk the basic elements of our society such as power and cyber infrastructures, financial services, health systems, transportation systems, etc. as they become more and more interconnected and also dependent on intelligence devices that are potentially “susceptible to a range of disruptive and deceptive tactics that might be difficult to anticipate or quickly understand” [8, p. 1]. Taken together technological advances in the computer and information technology are rapidly increasing the potential impact of cyber terrorism and warfare in ways that are not anticipated, fully understood or prepared for by the international community, nation states, corporate entities or individuals.

Technological advances in what are termed dual-use technologies may enable less technologically advanced nations and even small sub-state groups to potentially commit great harm to society in the future. For example in the area of biological weapons, James Clapper states “that given the broad distribution, low cost, and accelerated pace of development of the dual-use technology, its deliberate or unintentional misuse might lead to far-reaching economic and national security implications” [8, p. 6]. In the area of biological weapons, cost reductions in powerful dual-use technologies are proceeding at almost unimaginable rates. For example, the cost of sequencing a human-sized genome, a dual-use technology has declined from \$95,263,072 in September of 2001 to \$1,245 to October 2015, a 99.9% decrease [9].

Technology can also significantly increase the endogenous effect of violence on societal decision-making. Today’s communications technologies have the ability to dramatically amplify and sensationalize acts of violence that in turn may drastically alter political dialogues and policy and often produces unanticipated and unrecognized outcomes. Thus although society typically focuses on how to control violence, there is relatively less focus on how even low impact violent events can impact political and societal choices.

Dual-use and other technologies represent threats to society, which currently does not have the systems in place to respond effectively to such threats. The key point is that these technological developments present risks of very severe consequences with an unknown but potentially very high probability of occurring. Unfortunately, they also represent developments that society is only beginning to assess and develop institutional standards and norms to control them. Only recently, the president of Microsoft proposed convening a Geneva Convention on Cyber Warfare [10].

Other externalities may disrupt our current ability to deal with violence and two of which, the economy and climate change, are examined in the following sections. However, despite progress in controlling violence, society is now facing another round of challenges that will require additional enforceable Schelling points. These undoubtedly will require stronger international coordination and regulation, something that is becoming less popular in a number of developed nations.

4 The Challenge and Opportunity of Economic Change

Between the end of World War II and the 1980s, the world witnessed historic economic gains by the United States, followed by Europe, Japan and later by various South East Asian nations, including of Korea, Singapore, China (Hong Kong) and Malaysia.

The two decades following the 1980's saw dramatic reductions in extreme poverty among developing countries across much of the world, and they witnessed a dramatic growth in middle-class level incomes in select South East Asian nations, especially China and to a lesser extent India [11]. However, during this same period much of the world has also experienced significant economic challenges that have negatively affected the stability of many countries, and the well-being of their citizens in unanticipated ways.

This period has witnessed increasing instability and increasing inequality in select labor markets, increasing economic insecurity among previously advantaged middle-class citizens of developed nations and continuing extreme poverty across a large number of nations. Inequality has increased in unexpected ways both within nations and across nations [11]. It also appears to have increased regionally within at least some nations (e.g., the Rust Belt in the US and Silicon Valley). In recent decades, incomes in developed nations have risen dramatically for the top one percent of their citizens but have stagnated or declined for many of their middle-class citizens [11] and decreased significantly for less educated members of their societies [12].

A great amount of research indicates that four major global forces are at work for most of the economic trends observed over the last three-plus decades. The four forces are the usual suspects of globalization, technology, financialization, and a weakening of social support systems [12]. Each of these forces is credited with contributing to an observed growing disconnect between wages earned by salaried workers and the productivity of workers [12]. Much discussion has revolved about the impact of globalization and technology on labor force jobs and wages. The globalization of trade along with the financial flexibility and incentives to improve operational efficiencies and lower the costs of production is recognized as motivating business enterprises to move the production of goods and services to lower-wage regions. This is credited with having had a significant effect on lowering or constraining the wages of workers in regions that lose jobs to other locations [11, 12].

Globalization and technology have also been identified as key sources of the overall loss of jobs from at least some higher wage nations to lower wage fast developing countries [11, 12]. More recently, fears are rising that technology may produce significant net jobs losses across both developing and developed countries as the pressures of competition to increase efficiency push enterprises to substitute capital for labor especially as the cost of technology decreases and as knowledge about how best to integrate technology into enterprise operations increases [13]. Integration of innovative technologies typically takes longer than anticipated but then later produces unexpected increases in productivity as they are integrated into enterprise operations and procedures [14].

The extent of such expected job losses has been debated with fairly divergent projections arising from different methodological approaches. The most extreme job loss projections due to technological advances and automation come from Frey and Osborne who found that 47% of US jobs are at risk of being automated [15, p. 25]. Using a methodology, based on the automation of job tasks versus the occupation-based approach used by Frey and Osborn, McKinsey Global Institute estimates that although less than 5% of all current occupations contain job tasks that are 100% automatable, at least 30% of job task profiles are automatable for about 60% of

current occupations [13]. They argue that workers in occupations classified as vulnerable to automation may, in fact, be less exposed than previously thought, because they perform a substantial share of non-routine interactive tasks, which are known to be less automatable, at least in the present. Using this methodology, Arntz, Gregory and Zierahn [16] conclude that only 9% of OECD jobs are potentially automatable.

These divergent projections highlight the challenges of projecting job loss due to technology, but there is reason to consider that the potential severity of risks arising from technology may tilt towards more disruptive societal consequences. The potential for a more negative prognosis rests on considerations not generally addressed in current labor market research, which include the need for more direct feedback from business leaders and managers and an under-appreciation for ongoing systemic changes in commercial markets and the labor force structure. Regarding business leader feedback, there are now suggestions that Artificial Intelligence (AI) may be replacing or greatly reducing the need for workers with advanced analytic skills [17]. This suggests that over the longer term AI will have an increasing ability to handle very complex tasks and managerial decision-making and thereby reduce the number of workers required to conduct them. Like manufacturing, human workers will still be required to manage and assess the work of AI systems, but many fewer workers will be required actually to do the work. These may represent currently higher order cognitive and better-paid occupations such as accounting and perhaps financial services.¹

In addition, technology and globalization also produce what can be termed winner-take-all remuneration structures across industries, within enterprises, and across different regions and countries [11]. At the worker level, technology is creating the phenomenon of scalable jobs where a person's unit of labor can be sold many times over again with no extra effort [11, 18]. Thus in the past, an individual pianist could only give one concert at a time (and thus there was a demand for multiple pianists to give concerts) today one pianist can distribute music to anyone across the world. If this person is deemed the "best" pianist then there is significantly less need for additional ones. Likewise, information technology companies are increasing providing cloud-based centralized management and security services to business enterprises. The businesses that purchase such services are then able to then replace their own IT workers or reassign them to more routine and lower paid work. This creates a situation where very small differences in individual talent, training or luck can lead to the very large income differences across workers. In this example, a manager of centralized technology services probably draws a much larger salary than the IT specialists supplying centralized services and these relatively few centralized IT service workers likely receive much better wages than do IT workers working for individual business enterprises. This dynamic appears to create very large wage differentials and produce a reduction in the total number of workers required in a given occupation.

At a nation state level, technology and globalization also appear to be creating winner-take-all processes between regional economies. The productive capabilities of

¹ Nearly, all researchers caution that the rate of technological innovation will likely disrupt labor markets in the short run, as workers may not be able to adapt easily to the new skills or jobs that emerging labor markets require [16].

technology combined with national/regional prior advantages (e.g. low wages, highly educated workforce, pre-existing economic organizational conditions, existing financial services/incentives, natural resources, etc.) give regions or nations the ability to dominate particular industries. Moreover, the increases in productivity that technology provides can make it difficult and unnecessary for other nations/regions to try to enter a dominated market. That is to say, only so many Germanys are needed in Europe, and if say Italy was to become 25% more productive than Germany, then much of German industry would no longer be needed. The result is that labor market and income inequities have grown in ways that help create social and political instabilities in unexpected or at least unaddressed ways. Thus, Middle Eastern countries have some of the highest youth unemployment rates in the world, which has likely added to social unrest in those nations, and over the last 30 years, middle-class citizens of developed nations have experienced deteriorating economic circumstances, which has contributed to political alienation and xenophobia among individuals hardest hit in those nations.

Beyond labor market instabilities, today's economic and financial systems have shown significant instabilities often in unanticipated ways. After the onset of the 2008 recession, everyone asked why no one saw it coming. Since then economists and other experts have failed to develop reliable explanatory models of the economy and financial system that would allow us to assess and respond to or better yet prevent such crises. Galbraith [19] argues that for a variety of reason current economic systems are inherently unstable over the long run and subject to crashes of varying but unpredictable severity. He postulates that these systems tend to create unsustainable bubbles as actors (individuals and enterprises) within the system begin to engage in risky behavior or even corrupt practices to advance themselves often at the expense of other actors. Moreover, these tendencies often go unrecognized or are consciously ignored by an individual with the most to gain from the systems while they are stable and growing. However, at some point, as in the financial crisis of 2008, inconsistencies in the systems build to such a point that they unexpectedly collapse in highly destructive ways [19]. In the wake of such collapses, those most disadvantaged often suffer the most. In the period following the 2008 crisis, unemployment rates rose in Middle Eastern countries, in financially stressed Southern European nations [12], and even in selected middle-class groups in developed nations. These shocks further aggravated already unstable conditions in at least some of these nations.

Apart from economic circumstances, technological change and globalization also are producing unanticipated destabilizing pressures on cultural traditions, individual's social statuses and the connection of individuals' to their societies. This can be tremendously stressful and disorienting for persons experiencing such change. The World Economic Forum (WEF) reports that deepening "social and cultural polarization" [20, p. 24] is a significant trend factor that can undermine democracy. Giddens [21] terms this the process of "detraditionalization" and contends that in a globalizing world, individuals are increasingly in contact with others who think differently and live differently, from themselves. This occurs through the almost omnipresent exchange of digital information and images that are now routinely transmitted across the globe, and also occurs even more directly through the ongoing massive migration of rural populations to urban areas in developing countries. Individuals benefiting from these processes welcome them, whereas those who do not benefit or understand such

development may find them disturbing and threatening. Individuals who are threatened by such developments may revert to traditions that are familiar to them, whether in the form of religion, ethnic identity, gender identity or nationalism. Such processes produce stresses on the individual that make it easier to fuel divisiveness between different groups of actors, which can be exploited by leaders of opposing factions [22, 23]. In fact, the salience of populist movements has been associated with framing job insecurity as an outcome of globalization [24]. Such outcomes can lead in unexpected ways to intergroup conflict or, more subtly but equally negative, major misallocations of societal resources (e.g., guns versus societal investments).

Over the last 70 years, our current economic systems and technology have produced unparalleled economic growth, lifted large numbers of humans out of poverty and created new and growing middle lifestyles in developing nations. At the same time, continued progress is not at all guaranteed. The global character of economies and the financial industry along with rapid technological change produce growing equality and high levels of stress, anxiety and in some cases anger among those who have become disadvantaged by the economic and social change. More generally, today's economic and financial systems are prone to potential severe instabilities in fairly unpredictable ways. Finally, our economic system and the profit orientation of our financial systems have accumulated what amounts to as massive environmental debts that must be paid for society to survive. Addressing the challenges presented by our economic and technology systems will undoubtedly require stronger international coordination and regulation, something that may meet increased resistance from rising nationalism in some countries.

5 Threats to the Natural/Environmental Systems

Threats to natural systems, upon which society depends, represent the most obvious case of how humans must address externally imposed requirements or suffer severe and perhaps catastrophic consequences. These requirements represent the range of material conditions required for natural systems to continue to support sustainable human communities. The causes and inevitability of climate change are well documented by an extensive body of research across a broad range of scientific disciplines [24]. The severity and especially the timing of potential consequences of climate change are being debated but the prospect of potentially very severe consequences on a human time scale (e.g., one to several generations) are quite possible and not easily correctable once climate systems equilibria have changed [25]. In addition, climate scientists continue to discover positive feedback loop processes (e.g., the increasing escape of the greenhouse gas methane from thawing permafrost and from warming ocean floors) that may accelerate climate change [26].

The impact of climate change on social and economic systems over the next century include the potential to undermine the world food supplies and access to fresh water, increase the prevalence of infectious diseases, increase sea levels and bring about extreme weather events, such as droughts, heat waves, tropical storms [26]. Such conditions, not only directly affect the well-being of individuals who experience them but also can indirectly affect society by producing unexpected displaced populations

and more generally destabilizing communities. The civil war in Syria has been associated with a severe drought that internally displaced 1.5 million citizens from rural to the urban area of Syria before the civil conflict that started in 2011. Climate modeling research, “indicate that a drought of the severity and duration of the recent Syrian drought, which is implicated in the current conflict, has become more than twice as likely as a consequence of human interference in the climate system” [27, p. 3241].

The key challenge to addressing climate change is the need to develop and implement global strategies and institutions that will keep our climate within the environmental system boundaries necessary to support sustainable human societies. One of the clearest general strategies was recently published in the journal *Science* [28], which proposes establishing a carbon roadmap, based on the simple principle or “carbon law” of halving greenhouse gas emissions every decade” [28, p. 1269]. Rockström et al. [28] argue that such a roadmap can help align actors and organizations to implement technological and institutional breakthroughs necessary to meet the collective challenge of climate change. They also note that, if political signals do not support rapid economic systems transitions, “for example, by a failure to implement worldwide financial and regulatory reform that places a cost on carbon, then it is difficult to imagine keeping warming” [28, p. 1271] at levels considered essential to avoid severe climate change related consequences.

Critically, like threats arising from intergroup conflict or instabilities in our social and economic systems, addressing the challenges of climate change and environmental degradation will require developing and implementing new external standards and that in turn will require much greater levels of cooperation among members of the global community.

6 Summary and Conclusions

The interconnected and interdependent structure of the comprehensive threat environments described above, along with the often unpredictable and uncontrollable threat outcomes and cascading impacts associated with fat-tail threats follow a dynamic complex system structure [29]. In each case, society may need to meet requirements that are either externally imposed, unknown or both to establish reasonable levels of security. Each of the threat areas examined here essentially contains at least some non-negotiable conditions that must be met on their terms and not on terms established by human actors. These conditions are perhaps most obvious for climate and other environmental systems upon which society depends. However, externally imposed limits can also apply to intergroup related conflicts that can escalate into nuclear or biochemical confrontations or for social and economic systems that can fail in unexpectedly destructive ways. The non-negotiable character of such threats can arise due to society’s dependence on natural, economic and social systems. The external and unknown origin of such failures along with their ubiquitous consequences greatly increases the need for cooperation between actors across the globe if we are to successfully address the risks they entail. Competition among actors on the global stage will likely result in a failure to meet these externally imposed conditions. The unpredictable timing and severity of these risks suggest that the global community will also

need to take a long-term insurance-oriented investment strategy to address these challenges.

Finally, the external nonnegotiable character of threats facing society today will require the development of global institutions, international and national cooperation, along with value systems and norms that better support social justice and human rights. Such institutions and norms will better enable society to engage in broad based longer term strategies to address these threats. Critically, since identifying specific causal mechanisms associated with fat-tailed threat is often difficult to accomplish, investing in strategies that can yield multiplicative benefits may be the most productive avenue to establishing more secure, resilient societies. Fortunately, the fact that each type of risk is deeply interdependent with the others raises the likelihood that addressing one area may yield multiple benefits across other areas.

Acknowledgements. We would like to acknowledge the contributions of Eileen Kirk for her editorial and research support as well as of Parth Baxi and Sarah Schulte for their research assistance in the early stages of this project.

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