RESILIENCE IN THE FACE OF DISRUPTIONS

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Note

The views expressed in this document are not a reflection of the views and policies of any government but solely those of the authors. The document represents a compromise, rather than a consensus view, and the authors are not agreed on every single issue.

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Foreword

Ambassador Ong Keng Yong

We live in a society that always faces changes. In fact, technological, societal and cultural changes are an integral part of human civilisation throughout history. There are two sides to the changes, however. While on the one hand, they may bring about positive development, they may also lead to disruptions. Take the proliferation of information and communication technology (ICT) use in our daily life, as an example. Along with the convenience it brings, society's increasing dependence on ICT poses greater privacy and security concerns. Similarly, we see how changes in climate lead to extreme weather and disaster events and bring disruptive impacts to humanity.

In light of the disruptive repercussions of change, it is important for us to identify what they are and prepare ourselves accordingly. One of the most pertinent changes that deeply affect our society today is the Fourth Industrial Revolution (Industry 4.0). The impact of Industry 4.0 is not just in its expansion, but the speed of change that has created new sets of social issues. For instance, the complexity of technological transformation has made certain skills much more valuable and disproportionately benefited those with cutting-edge research and development capacities. This suggests impending structural changes, not only to social, economic, and political institutions and processes, but even mental paradigms that will have to accommodate the transformative effect of technology. Lurking behind the appealing advantages of Industry 4.0 is a set of social, economic, and political consequences, which remain unknown and unpredictable.

We need to understand the implications of disruptions in different aspects of life to enable us craft solutions and build resilience accordingly. Such an understanding will guide us in mobilising the necessary resources as the well-targeted allocation of resources will help in addressing disruptions more effectively. It will also propel the mobilisation of different segments of the community to deal with different types of disruptions. The involvement of more actors will yield to a more robust and resilient system

in facing disruptions. Greater resilience can also be achieved through new solutions brought by innovative thinking, methods, and products, and these may lead to greater resilience.

"A chain is only as strong as its weakest link," applies to resilience building too. While disruption is not a new phenomenon; innovative and collaborative approaches are still needed to manage its implications. Enhancing cooperation among and within societies to work on specific areas affected by disruptions is, therefore, imperative. Multilateralism and multi-stakeholder cooperation are crucial for finding sustainable solutions to transnational problems arising from disruptions.

Ambassador Ong Keng Yong
Executive Deputy Chairman
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Executive Summary

Human activities, technology and climate change drive changes to our environmental landscape and societal order. Marine microplastics arising from woeful human use of plastics threaten marine ecology. Excessive fossil fuels consumption disrupts weather systems and consequently undermines food security. Unequal access between the "haves and have-nots" aggravates food insecurity. Without meaningful intervention, annual deaths from food-borne diseases (FBDs) caused by antimicrobial resistant (AMR) bacteria will reach 10 million in 2050. Human displacement continues unabated across state lines as humanitarian crises require fresh responses. The ubiquitous use of information and communications technologies (ICTs) has created a new landscape where cyber-threats target both hardware and software and where truth has become its latest victim.

The Annual Conference of the Consortium of Non-Traditional Security (NTS) in Asia held on 27–28 March 2018, in Singapore, examined responses to these uncertainties, if not threats to humanity, arising from key disruptions. This monograph compiles some of the views presented by the members of the NTS-Asia Consortium at the annual gathering.

Technological advancement has triggered revolutionary changes in many aspects of societal life, like the nature of interpersonal communication, information processing, business transaction and political campaigning. However, both people and states are not yet prepared for the disruptions brought about by technological breakthroughs such as privacy breach, cybercrime and even cyberterrorism. Regulation and legislation are not in pace with the fast-changing reality, leaving gaps in cyber governance.

As growth in agricultural yields slows down in certain areas impacted by climate change, it is important to explore alternate crops, better crop varieties, and promote innovation in this sector. This is also partly because access to food remains unequal among communities and among states. Productiv-

ity gains have been recorded, as direct outcomes of research investments. However, financial support from western states for agricultural research is declining, and this constitutes a disruptive factor in the agricultural sector of many developing countries. As the region's per capita income increases, and as it benefits from investments, more Asian countries should assess how they can invest more in agricultural research.

Effects of climate change like extreme weather events lead to significant human casualties and economic losses with Asian countries being particularly vulnerable, like the Philippines and Bangladesh. While countries and people have to adapt to and mitigate the effects of climate change, one significant concern is the controversial use of geoengineering – a future alternative option to address the impact of climate change. By controlling weather systems along geographical lines, it entails large-scale artificial intervention on the climate system with the aim of saving the Earth from the worsening effects of climate change. Yet, the unbridled use of geoengineering may lead to unintended consequences, like altering the ecosystem, inadvertently producing toxic elements and utilising geoengineering tools for malicious purposes other than addressing climate change.

Meanwhile, the humanitarian sector has witnessed new trends with old problems, like the unprecedented scale of forced displacement induced by conflicts and disasters. The existing frameworks are insufficient to deal with the pressing challenges, as in the case of Malaysia, which now is facing growing pressure over Rohingya refugee issues.

Introduction

Mely Caballero-Anthony and Margareth Sembiring

Against a rapidly changing global environment, societies are now having to deal with a host of challenges to their security and way of life. Many of these challenges—from climate change, resource scarcity, emerging health threats and rapid technological advances have had a significant disruptive impact on human security. In the 21st century, how societies respond to disruption(s) and manage their transformative effects would largely be defined by the extent to which they are able to comprehend the complex consequences of such disruption on their social, economic and political institutions that shape their everyday lives.

A key element in dealing with disruption is building resilience. This was the key theme of the 3rd Annual Conference of the Consortium of Non-Traditional Security (NTS) Studies in Asia, held on 27–28 March 2018, in Singapore. This monograph compiles the papers presented by members of the Consortium which examine the kinds of human insecurities and uncertainties brought on by disruptions. The papers also analyse the current responses by states and other actors to these uncertainties and point to specific recommendations on how societal resilience can be built in the face of disruptions.

We begin this introductory chapter with a brief conceptual discussion on disruption and how we can unpack its impact on human life. We then provide a short summary of the main themes presented in this monograph from the papers that were delivered at the 3rd Annual Conference of the NTS-Asia Consortium.

UNDERSTANDING DISRUPTION

Disruption comes in various forms, and its definitions vary according to contexts. In a broad sense, the word "disruption" conjures up an image of discontinuity from an ongoing process that may result in a change to the

current process or a stop to it altogether. In sociology, an event disrupts when it intercepts defined and heretofore enduring societal structures and processes.[1] In the political sphere, disruptions may refer to a challenge to existing government-led societal order that is manifested in demonstrations, coups and revolutions.[2] The emphasis of disruption is on the process instead of a single event. This echoes Clayton Christensen's view that says "disruption is a process, not an event, and innovations can only be disruptive to something else."[3]

From these views, we can look at a disruption within a cycle of processes involving the society and its social, economic, political and cultural components, and its research, technological, and policy responses to intentional and non-intentional changes that come from within and/or outside. While such changes most likely disturb the equilibrium within these societal components, their effects may lead to revolutionary impacts if such changes are disruptive, or to evolutionary impacts when they are gradual. Gradual changes are conceptualised as those that continue a pre-existing trend or structure; disruptive changes are those that prompt a rupture with those trends and challenge and re-invent structures. Both gradual and disruptive changes can be positive or negative, and in reality, are likely to be both, simultaneously, depending on which socio-economic group's perspective an analysis takes.

When a society is non-responsive, however, these changes may have no effect and the status quo is maintained. The revolutionary or gradual impacts brought about by such changes may then trigger a new wave of responses leading up to another set of changes. This idea is depicted in Diagram 1 below.

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1   Hendrik Vollmer, 2013, "The Sociology of Disruption, Disaster and Social Change", Cambridge University Press

2   Stephen J. Kobrin, 1977, "The Conditions under which Political Disruption Results in Increased Political Risk", Working Paper, Alfred P. Sloan School of Management, Massachusetts Institute of Technology

3   Steve Denning, "Fresh Insight from Clay Christensen on Disruptive Innovation", Forbes, 2 December 2015 https://www.forbes.com/sites/stevedenning/2015/12/02/fresh-insights-from-clayton-christensen-on-disruptive-innovation/#6a71c3eb4702

DIAGRAM 1
The Definition of Disruptive Change within the Context of Societal Elements and Responses
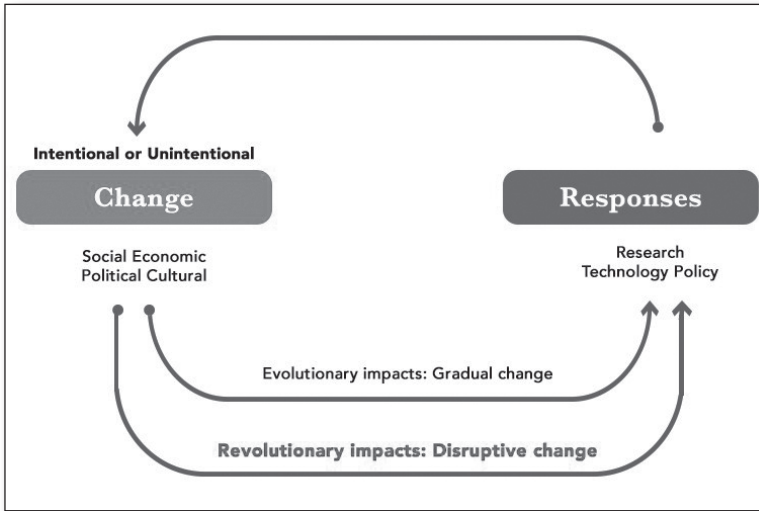
TECHNOLOGY AS DISRUPTOR

The world is abuzz with the rapid technological development, specifically in the information and communication technology, in the last three decades. Famously dubbed as the fourth industrial revolution, or Industry 4.0, technology is perceived to act simultaneously as both a positive and negative disruptor. Little contention can be levelled against the massive scale and impacts of the distribution of smartphones among populations across the globe, and the steep rise of the use of social media as a result. The same technology has transformed physical interactions and transactions to virtual ones and enabled rapid exchanges of information to an unprecedented scale. While technological advancement holds out promises for better human living, the downside of such progress is being eyed warily by policymakers and societies alike.

Central to the concerns is the "known unknown" and the "unknown unknown" implications of the technological wonders, especially in relation to social structures and institutions as well as the larger economic and political spheres. In trying to unpack the social, economic and political

consequences of Industry 4.0 and fleshing out causal relationships, we see the usefulness of adopting the interdisciplinary approach of Science, Technology, and Society (STS) as it brings out the salience of social contexts. According to the STS approach, technological development does not take place in a vacuum. Instead, it is socially constructed[4] and politically directed.[5] Networks of individuals and groups orchestrate and govern the advancement of technologies,[6] and the success rate of its adoption is heavily dependent on the social, economic and political make-up of the receiving society.[7] The interface between technology and human users gives rise to "sociotechnical" concept[8] and forms the basis for important social considerations surrounding the development of modern technology.[9]

Thus, in recognising the salience of social, economic and political aspects within technological realm, there is a critical need to assess the disruptive impacts of technological development on a number of issues within the society.

4   Wiebe E. Bijker, Thomas P. Hughes and Trevor Pinch, 2012, "The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology – Anniversary Edition", Cambridge, MA: The MIT Press.

5   Langdon Winner, 1986, "The Whale and The Reactor: A Search for Limits in an Age of High Technology", Chicago: The University of Chicago Press.

6   Bruno Latour, 2005, "Reassembling the Social: An Introduction to Actor-Network-Theory", New York: Oxford University Press; Michel Callon, The Sociology of an Actor-Network: The Case of the Electric Vehicle, in: Callon M., Law J., Rip A. (eds) Mapping the Dynamics of Science and Technology. London: Palgrave Macmillan, pp. 19–34.

7   Langdon Winner, 1977, "Autonomous Technology Technics-Out-of-Control as a Theme in Political Thought", Cambridge, MA: The MIT Press; David Noble, 1984, Forces of Production: A Social History of Industrial Automation, New York: Knopf.

8   Eric Trist, 1981, "The Evolution of Socio-Technical Systems: A Conceptual Framework and an Action Research Program", Ontario: Ontario Ministry of Labour, Ontario Quality of Working Life Centre; Gensheng Liu, Rachna Shah and Roger Schroeder, 2006, Linking Work Design to Mass Customisation: A Sociotechnical Systems Perspective, Decision Sciences 37(4): 519–545.

9   Donald MacKenzie and Judy Wajcman, 1999, "The Social Shaping of Technology" 2nd edition, Buckingham, UK: Open University Press.

BEYOND TECHNOLOGY: TRACKING MULTI-FACETED DISRUPTIONS

Disruptive changes are manifested in various ways. In this Monograph, we will see how disruptions play out not only in technology-related applications but also in the domains of environment and climate change and human displacements. Apart from identifying the type of disruptions and assessing their impacts on different elements within the society, the Monograph presents some approaches to building societal resilience in the face of these disruptive changes.

Jean Bogais discusses the impacts of technological development on the society. He frames technological development as a source of disruption primarily within sociology and psychology contexts. Applying Heidegger's approach to existentialism, technology is seen to generate disruptive instead of gradual changes because it causes humanity to contract schizophrenic syndrome resulting in vulnerability to ideologies and networks of violence. He argues that building resilience against technology-driven disruption can be done through organisational research using complexity theory as a basis.

K S Balakrishnan, Siti Mazidah Haji Mohamad and Gulizar Haciyakupo-glu provide more specific examples of such disruptive impacts of technology, particularly in the cyber realm. While Balakrishnan notes the benefits of the Industry 4.0 on Malaysia's economic transformation and development, he highlights the evolution of threats brought on by the rapid development of digital technology, notably the Information and Communication Technology (ICT) and the Artificial Intelligence (AI). These threats not only affect Malaysia's security but also the ASEAN region. The disruptive impact of such progress lies primarily in the insufficient capability of existing national laws to effectively manage the issues despite the existence of experts groups like the Study Groups in the ASEAN Regional Forum (ARF) and Council for Security Cooperation in the Asia Pacific (CSCAP). He also observes that countries deal with these challenges on their own despite having some degree of awareness of the commonality of risks among them. To address the problem, Balakrishnan proposes collective approach regionally and globally that aims especially at enabling innovative technological solutions.

Following the Malaysian case, Siti Mazidah Haji Mohamad looks at the challenges brought about by the deep penetration of social media on Bruneian citizens' privacy and security. She notes that a user's own defini-

tion of privacy affects the perception of risks. Instead of being a potential disruptor, self-disclosure on social media is accepted as part of today's social life and is essential for maintaining relationships with others. She argues that self-disclosure and associated risks at the private sphere will spill over to the larger society and engender public disorder and disturbance. A deep understanding of Bruneians online behaviour, therefore, is necessary to the drafting of law and policies on citizen privacy protection.

Gulizar Haciyakupoglu focuses on another dimension of the disruptive impacts of cyber technology development. She looks at the scale of production and rapid propagation of fake news or disinformation. Communication technologies including social media open more entry points for disinformation to reach people that can be used for malicious purposes including engendering domestic, regional, and international instability. She highlights that while real-life examples of disinformation abound, measuring the scale of the effect and identifying the network behind orchestrated disinformation campaigns is greatly challenging

Echoing Balakrishnan, Gulizar Haciyakupoglu emphasises that collaboration within and across states are needed to enable flexible, multi-pronged approaches to addressing the rapid production and dissemination of fake news. She points to country-based disparities in financial, social and political climate accommodating the developments and solutions, and differences in openness to change and adaptability to solutions between societies may result in variances in the nature of, approaches to and the impact of disinformation campaigns between countries. Such differences render cooperation all the more important in the efforts to establish collective resilience.

Paul Teng discusses the different factors that affect food security. Among the four dimensions of food security namely food availability, physical access to food, economic access to food, and food utilisation, Paul Teng argues that food availability is the dimension most vulnerable to disruptions. It is also the dimension in which the farmer-producer takes the most risk of loss from a host of factors including unexpected severe weather, natural calamities, pest and disease outbreaks, input (fertilisers, pesticides, seed) shortages, and human pandemics. Access to food, whether physical or economic, is susceptible to rising energy prices, sudden policy changes, a diversion from staple to cash crops, conflict or terrorist activities, artificial price hikes, alternative uses of food crop biomass, and outright trade wars. Food utilisation is linked

with food safety issues including possible contamination by chemicals or biological agents, diet changes from urbanisation and a consequential effect on the incidence of non-communicable diseases such as diabetes and obesity, human health crises, and presence of unapproved food ingredients.

In terms of technology advancement, Paul Teng points out that different technologies have brought numerous disruptive impacts to agriculture production and yields since the 1960s. As this sector has benefited greatly from technological advancement, negative disruptions are therefore defined as factors that may hinder the maximisation of the benefits of such technologies.

Taking the issue of food security from a different angle, V. Bruce J. Tolentino brings in the disruption caused by a decline in the funding of international agricultural research, particularly from developed Western countries. He explains that strong funding sources had thus far enabled the significant reduction of hunger and famine worldwide. What is concerning is that while total funding from the Official Development Aid (ODA) has been rising almost continuously over the past decades, the share for Rural Development and Agriculture (RDA) broadly, and agriculture more specifically, has fallen from US$20 billion in the early 1980s to less than US$5 billion in the mid-2000s. Cutting them down threatens the very positive impacts they have brought to date. As funding from donors decline and support from national government is not guaranteed, international agriculture research institutions need to be able to adapt by finding new funding sources or new modes of funding for their research undertakings.

Disruptions to the environment are commonly referred to in the context of the changing climate. ANM Muniruzzaman offers his perspective of the disruptive implications brought about by geoengineering. Geoengineering is a large-scale direct human intervention on the earth's natural system to address the negative effects of climate change without necessarily curbing carbon dioxide emissions from the earth environment. Two major methods include Solar Radiation Management (SRM) and Carbon Dioxide Removal (CDR). While geoengineering is devised to respond to climate change challenges, the misuse of its development can potentially pose significant security threats globally. The most serious issue of concern is that the consequences of geoengineering are unknown and uncertain. Moreover, under the guise of addressing the global climate, geoengineering technol-

ogy may be weaponised as advanced countries exploit it for their military and political ambition over other countries. Building resilience against such disruptions, therefore, can only be done through global rules and regulations and sufficient research and pilot experiments. Until these are put in place, ANM Muniruzzaman asserts that geoengineering development should be put to a halt.

Minha Lee, Serim Lee, and Yongsung Cho discuss the link between global warming and increasing disaster events from years 1900 to 2016. They point out to the different impacts and costs of disaster risks in different areas irrespective of the hazard characteristics. In general, poorer and less developed economies suffer more from a disaster event although richer countries have a lot more to lose in terms of material possessions. They allude to current market economy relying too heavily on production-consumption cycle that results in endless consumption and excessive use of energy and wastes, which in turn increases global temperature and causes climate change. Severing the link between economic development and excessive use of energy, in particular fossil, is therefore key. In this light, they view technological advancement as a positive disruptor to the environment and climate change that offers possibilities to diminish the use of fossil fuels, effectuate more efficient energy usage, which will then reduce carbon emissions. They warn, however, of the danger of keeping those technologies only in developed states. To build resilience against climate change challenges, ensuring equitable distribution of such technologies particularly in developing economies is critical.

Grace Jamon paints a sombre picture of the Philippines' vulnerability in the face of disasters despite numerous measures taken at the national level. She critiques the "Natural Disaster Consciousness Month" initiative that aims at informing the Filipino people on the reality of global warming and climate change, how it affects the country, ways to prevent even more disasters, and how to prepare for them by pointing out that this initiative only results in breeding an acceptance that natural disasters will always happen, nothing can be done about it except to prepare oneself. Similar to Minha Lee, Serim Lee, and Yongsung Cho, Grace Jamon is also of the view that overconsumption and increasing waste generation brought about by economic development, often fuelled by competition and innovation itself, are the chief factors leading to climate change. By its very virtue, therefore, private sector working on innovations is the source of environmental

damage and ensuing climate change. Thus, she argues against glorifying the term "disruption" in the context of innovation and proposes "climate disruption" to describe the adverse effect of their activities on the environment instead. In so doing, businesses will be reminded of the large role they play in the climate crisis, increasing resilience against climate change needs to begin with genuine considerations towards the environment in the operations of businesses. The people, on their part, also need to move away from piecemeal and often mindless responses on various environmental-friendly initiatives and commit their care for the environment in a sustained manner.

Last but not least, the Monograph also features disruptive changes in relations to human displacement. Reflecting on the Malaysian experience, Puteri Nor Ariane Yasmin and Puteri Amida Afsha Afzan highlight the challenges that the Rohingya crisis poses on the Malaysian Government. Malaysia's status as a country of final destination for the Rohingya is attributed to a number of pull factors such as the relatively short travel distance between Myanmar and Malaysia (in comparison to other destinations), economic opportunities, religious similarities and the established Rohingya community who has been living in Malaysia up to three generations. Despite not being a signatory to the 1951 Refugee Convention and its 1967 Protocol, Malaysia still has to deal with refugees and asylum seekers coming into the country under the "responsibility to protect" vis-à-vis the principle of non-refoulment and the obligations of the shipmaster as outlined in international maritime law.

Against this backdrop, Puteri Nor Ariane Yasmin and Puteri Amida Afsha Afzan propose a comprehensive policy embodying three key initiatives including the registration of the Rohingya with UNHCR Malaysia, the formalisation or regularisation of their status in a national database and issue appropriate identification documents, and a regulated work scheme as originally planned by the Government in 2017. A comprehensive policy to deal with the issue systematically is critical to building Malaysia's resilience against such challenges.

Redefining the Human in an Info/ Technological World

Jean Bogais

Set against the backdrop of the potential weaponisation of nanotechnologies first created for civilian use, this essay will posit that, if history is ignored, the technology could irrevocably displace the entire social system from its historically central role in determining the future of human society. We are entering a new Age, that of Quantum - Artificial Intelligence, Robotics, Cyber - the societal implications of which challenge historical analogy.[10] Some important questions arise. For example, will future technologies prove to be at the service of peace or war, or - most likely - a complex combination of both? How will our modes of thinking adapt and keep pace, when change itself becomes subject to the ambiguities of radical technological uncertainty?

Comparing this coming Age with that of the early 20th Century helps both to identify the centrality of the issues at stake and to better understand the questions raised by the German philosopher, Martin Heidegger[11] on the eve of World War II about modernity and the impact of technology on society – and their relevance 90 years later. Populism,[12] a familiar term used at length by today's intellectual elites existed then - it was called National Socialism![13] Looking across the West now, the dark psychology of the past is re-appearing and some of the dynamics that marked the early 1930s are rapidly becoming identifiable in the thinking and policies of today. Only by exploring the entanglement between past, present and future, the life and death consequences of getting the question of technology correct be revealed. A psycho-sociological approach to the questions at stake should/ must be used to fill the gap in people's knowledge.

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10 Project Q. Peace & Security in a Quantum Age. Centre for Intl Sec Studies, University of Sydney
11 Stanford Encyclopaedia of Philosophy. Martin Heidegeer
12 Encyclopaedia Britannica, Populism
13 Yad Vashem. Shoah Resource Center. National Socialism

"ATOMS FOR PEACE": CRISIS BETWEEN TECHNOLOGISTS AND PHILOSOPHERS

In the famous 1922 encounter between Albert Einstein and the French philosopher Henri Bergson[14] at the College de France in Paris, Einstein dismissed the philosopher's encroachment on the matters of space-time with the abrupt, "Il n'y a donc pas un temps des philosophes".[15] His dismissal of philosophy had a chilling effect on future high-level intellectual debates. By claiming that the time of the philosophers no longer existed, Einstein also threw into question the possibility of a future that was "open, unpredictable and indeterminate". Einstein's words had a pernicious effect on future debates between technologists and philosophers, calling into question the boundaries of technological advancement with radical implications for human subjectivity and social being. Only 23 years later, US President Harry S. Truman ordered that the new weaponised technology be used against Japan to bring WW2 to an end.

On the verge of World War II and urged by fellow physicist Leó Szilárd,[16] Albert Einstein wrote a letter to Franklin Roosevelt, informing the US President of a new source of energy that could lead to the "construction of tremendously powerful new bombs." A political chain reaction followed: the Manhattan Project, Los Alamos, the first use of nuclear weapons, superpower rivalry and an arms race that continues today. The discovery of nuclear fission would bring an end to the Second World War. It contributed to a cold war that never became hot and inspired the creation of a global movement to reduce if not abolish thermonuclear weapons. It also signalled the beginning of the propaganda component of the US Cold War strategy of containment of the Soviet Union. In his 1953 speech at the United Nations titled "Atoms for Peace",[17] President Dwight D. Eisenhower opened a media campaign aimed at "emotion management" to balance fears of continuing nuclear armament with promises of peaceful use of uranium in future nuclear reactors. In 2018, the term for this propaganda strategy would be "Information Warfare".

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14   Project Gutemberg. Henri Bergson
15   "There is no longer a time for philosophers"
16   Atomic Heritage Foundation. Leo Szilard
17   International Atomic Energy Agency. "Atoms for Peace", Dwight D. Eisenhower,
      President of the United States of America

A first-hand witness to the rise of Nazi Germany, Einstein wrote his letter while peering into the void of a world gone mad. A staunch pacifist, he hoped to harness nuclear energy for a better world. Seven years later, after the bomb ended the war with Japan and helped start the Cold War with the Soviet Union, Einstein voiced his regret for the inability of humankind to keep apace of a technology he helped bring to life: "The unleashed power of the atom has changed everything, influenced our modes of thinking, and we thus drift toward unparalleled catastrophe."[18]

NEW TECHNOLOGIES: UNDERSTANDING THE UNEXPLAINABLE

Nearly a century later, we find ourselves on the verge of a scientific revolution with equally – if not more - profound implications. Important ontological questions about humanity and science are once again re-emerging, as new technologies shrouded in secrecy and complexity are coming to life – technologies that have proven difficult to convey outside a hermetic circle of scientific experts and policy elites. One of them is "nanotechnology".[19] Born out of a superhuman effort to explain the unexplainable, nanotechnology faces almost total opposition from accepted beliefs. It makes one counterintuitive discovery after another and is then tested by subsequent experiments.

Nanoscience is the study of the structure and function of materials on the scale of nanometres that are one billionth of a metre or roughly the size of about ten atoms in a row. Under those conditions, light and matter behave in ways that differ significantly from those we are familiar with on everyday scales. These behaviours often defy the classical laws of physics and chemistry and can only be understood using the laws of quantum mechanics.[20] This uncertainty introduces some important societal questions: Will nanotechnology continue to develop on the premise of manipulating "nature" to serve society's illusions of perpetual need and comfort? Or, will the sur-

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18   NY Times, Aug 2, 1964. "The Einstein Letter That Started It All; A Message to President Roosevelt"

19   The University of Sydney Nano Institute

20   Nature (Internationall weekly journal of Science) "Quantum Physics: What is really Real?" 20 May 2015

prising and unpredictable nature of nanoscience teach society the caution and sense of limits required when intervening in the very conditions of its own existence, and lend itself to a new understanding and accommodation?

Of great concern to ethicists, nanotechnologies also have the potential to be hybrid[21] and switchable, applied to civilian use in areas of Non-Traditional Security (NTS), as well as in the battlefield. They can be non-lethal or lethal alternatives to Anti-Personnel Mines, for example. A question that arises is whether legislation will be introduced before the technology is deployed to prevent its use, and/or if existing legislation and treaties (for example the "Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personal Mines and/or their Destruction"), otherwise known the "Ottawa Convention", will be extended to include nanotechnologies, alongside the drive to ban fully autonomous weapons.

MARTIN HEIDEGGER: CONNECTING PAST, PRESENT AND FUTURE

It is the purpose of this essay to explain how the German philosopher Martin Heidegger's fear of modernity at a time of intense technological development, led him to be attracted to National Socialism, the Nazi movement. Between 1919 and 1933, Heidegger developed a vision of praxis and politics on an Aristotelian foundation[22] that he believed would reverse domination of theory and technology in modern life. Instead, he would replace it by a rule of practical wisdom, or *phronêsis,*[23] that was rooted in a historical understanding of the world, one that put human beings and human action ahead of ideological imperatives, and the processes of production. Heidegger believed the Nazi movement was bringing such a politics into "Being".[24] Even when he recognised this was not the case, he continued to believe such politics was both necessary and desirable, modifying only his conception of the means by which such an end could be attained.

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21 "Military Use of Nanotechnology: Perspectives and Concerns" Jürgen Altmann. JSTOR, March 2004

22 "An Investigation on the Aristotelian Foundations of Martha Nussbaum's Capabilities Approach and the Disability Issue Utilizing Nussbaum's Earlier Works on Aristotle". Rosemarie Dela Cruz Bernabe. Centrum för tillämpad etik Linköpings Universitet

23 "Practical Wisdom" Michael Lacewing. Routledge.

24 "Martin Heidegger" Internet Encyclopaedia of Philosophy

In the crisis of late 1920s and early 1930s, Heidegger believed he saw the moment for the transformation of Germany and the West: "Everywhere are convulsions, crises, catastrophes, misery, daily anguish, political chaos, instability, the undermining of art, the groundlessness of philosophy, the powerlessness of religion", he wrote. In contrast to many of his contemporaries, however, Heidegger saw this crisis not as a disaster but as a valuable shock that he hoped would stimulate a communal confrontation with the question of Being and that of modernity.

Heidegger, however, became disappointed by the public response to this crisis: the question that dominated public concern was not how to humanise technology but how to repair it and make it work better (i.e., more productive). In this context, Americanism and Communism seemed to seep in everywhere, Heidegger believed, however, that he discerned the possibility for renewal and salvation in the social and political program of Hitler and the Nazi movement. They seemed to offer the possibility of a confrontation with the problem of technology and the chance of subordinating it to the rule of *phronêsis.* In short, establishing what Heidegger was later to call a "free relationship to technology."[25] He was convinced that the possibility for such a revolution existed within this movement and within this movement alone.

Heidegger argued that faced with Americanism and Communism - the most dangerous forms of this technological impulse - Europe was being crushed by forces that aimed at the universal organisation of everyday man for the unlimited exploitation of the earth and all other human beings. In Heidegger's view, neither could provide man with the means to come to terms with technology because both are under the illusion that technology is merely a tool. This notion makes it impossible for human beings to assess entropy[26] and recognise or ameliorate their own degradation. The salvation of the West, thus, depends on again raising the question of Being as the question of technology.

Developing his argument on Being, Heidegger explains that the West began with the pre-Socratic experience of the question of Being. In contrast, Plato interpreted Being as eternal presence, accessible only by means of a

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25   "Martin Heidegger on Technology: A Response to Essentialist Charge". Aydan Turanlı. ResearchGate, April 2017

26   "Entropy, Information and Confusion in the Social Sciences" John L.R. Proops. Journal of Interdisciplinary Economics. January 1, 1987

long and difficult dialectical ascent. Being was projected even further into the unattainable transcendence of eternity by Christianity. Human beings could no longer experience Being immediately or even reach it through a dialectical ascent. Being was attainable only through grace. The final withdrawal of Being that characterises the Western metaphysics produces the death of God. This lies at the heart of modernity, a withdrawal of Being that leaves man himself as the foundation on which to establish the world. In this sense, man becomes the ground, or *subiectum,* that makes possible the transformation of nature into a universal object. The modern world for Heidegger is, thus, the ever more encompassing attempts to objectify nature, to convert it into an object that can be mastered and controlled. Heidegger calls this process technology. It culminates in a will to convert everything, including humanity itself, into a raw material that can be exploited and used up in the means of production (i.e., in the service of technology).

Despite his grave concerns about the role that technology played in the modern world, Heidegger was never simply an opponent of technology and never sought its abolition or destruction. As he saw it, the problem was not technology *per se* but the hegemony that technology had come to exercise over human action. *Technê*[27] as a form of uncovering reveals the world as a process of production. Everything within the world is, thus, merely the equipment with which this productive enterprise is carried out. Modern man imagines that technology produces goods to satisfy his wants and desires, providing what Thomas Hobbes called "commodious living."[28] Technology, however, can serve human beings if they act non-technologically - that is, only if they live according to something other than the technical, including economic imperatives. Only if distinctively human action is placed at the centre of our concern will technology serve our ends. We can only become active beings (as opposed to productive ones) if we are guided by *phronêsis*.

Heidegger's understanding of the relationship of technology and politics was certainly influenced by Jünger's[29] notion of total mobilisation and his vision of the worker as the "coming superman". Jünger believed at the time that the future belonged to technology. In his view, World War I made it evident that victory comes to those who are best able to mobilise all material

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27   "Episteme and Techne". Stanford Encyclopedia of Philosophy
28   "Hobbes on the Emotions" Stanford Encyclopedia of Philosophy
29   Ernst Junger Bibliography. Conversazione su Ernst Jünger e la Fedeltà a Firenze.

and human resources in the process of production. Politically, this means producing the kinds of human beings who are most productive. Jünger himself holds up America as the political model for the regime of the future because in America mobilisation is not constrained by class differences, cultural traditions, or any other factors. Heidegger came to recognise that the destiny of our times was essentially technological. The problem was not to eliminate technology but to establish a free relationship to it (i.e., a relationship that put the machine itself in service of human action). It became an ethical concern and it was this transformation of technology by *phronêsis* that Heidegger believed the Nazi movement might achieve.

Besides being opposed to Americanism and Communism, Heidegger believed the Nazis also despised high theory, experts, and intellectuals, trusting instead the feelings and sensibilities of the Volk.[30] They accepted the need for and value of technology and technical expertise but insisted it is subordinated to the good of the Volk. They were also resolute in their determination to form the German Volk into a German state. And finally, they recognised the necessity of having leaders who posed the deepest questions and acted resolutely on their insight into the necessities of the moment. Heidegger's view of National Socialism echoes that of Populism in the early 21st Century.

QUESTIONS ABOUT THE OWNERSHIP OF TECHNOLOGY: KNOWLEDGE SOVEREIGNTY

In 2016 the US Department of Defense stated that by 2022–23, new robotic soldiers will be active in the US Army[31] with a certain degree of artificial intelligence connecting them to the soldiers they are fighting for and with. The US Army has indicated that the next time it goes into counterinsurgency violent spaces, it will not be bringing back 4,000 or so dead Americans. In terms of military systems and the notion of "being in the loop", "human in the loop" means that humans are in a monitoring capacity. The new soldier systems are the first example of "human outside the loop". According to the US DoD, testing of the new technology is already underway

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30   "Volk" Encyclopaedia Britannica
31   "Policies on the Employment of Lethal Autonomous Weapon in Future Conflicts". Ted W. Schroeder. Dec 2016. US Department of Navy Innovation

and the schedule for the operationalisation of these robot soldiers is progressing as planned. This present and future connect to the past, to Jünger's 1930 comments on technology and the advent of the "coming superman".

This technological revolution contrasts with technologies developed in the 1950s and 60s, when technology first came through the military via computers, communication systems etc., and then used for spinoff, and the public good. A question now emerges: Who created artificial intelligence? Not the military. It came out of the learning environment. The answer introduces an ethical dilemma about the question of the ownership of technology [x] and whether it is created by civilian research for civilian use. Or is it a hybrid, as the civilian-created technology can and could be adapted to serve military purposes.[32]

NEW ETHICAL CODES NEEDED TO ADAPT TO RAPID CHANGES

There is an element of looseness with new technologies such as nanotechnology, robotics and Cyber. In the past, humans could see the effect of new technologies almost immediately, and relate to their impact on life. What differs now from the past is the disconnection between the perception of what the technology could be and the reality of what it is likely to be. Humans know them by name, but cannot reach out and touch them. They are part of an abstract construct out of arm's reach. Only 15 years ago, Cyber Warfare was a foreign notion among governments, military and businesses. As Cyber events unfolded, the race to protect has become the ultimate priority in the mind of strategists, military and civilian alike.

Returning to nanotechnology, it is difficult to understand the multitude of applications in which it will find itself. Proponents of this technology suggest that the world's needs could be met by utilising a limitless supply of atoms to manufacture valuable molecules. Yet, only a few elements may be understood, whether in the agricultural and medical fields for example. Where this may take society is not necessarily clear. Knowledge of what technology can do will only be revealed as scientists walk through research, and test and evaluate programs. There will be a need for new or evolving ethical guidelines in parallel with the technology, which will be consistent

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32   Defense Advanced Research Projects Agency (DARPA)

with any new technology until its application becomes clear. Further, new ethical codes and ways of thinking are needed to anticipate, understand and manage what is likely to be a rapid succession of knowable innovations, inventions and unknowable outcomes; the "black swans" that might be of low probability but with potentially high consequences for society.

CONCLUSION

This essay posits that, if history is ignored, technology could irrevocably displace the entire social system from its historically central role in determining the future of human society. It outlines the importance of the connections and parallels between uncertainties and instabilities that marked the 1930s and the early 2010s. Using Heidegger's complex lens of existentialism, the impact of technology on society could be seen as a psychological manifestation of the sociological problem of alienation, which itself is a consequence of the technological transformation of the world. It defines a condition in relation to existential fear, which is the concept of meaninglessness. Human beings need meaning, direction, values and ideals in life. Without them, the individual lives in fear of life itself. Certain forms of psychiatric illness can be analysed, for example, in terms of alterations in the sense of belonging to a world and in the associated ability to pursue possibilities. When the individual remains estranged from his own technology – when he can no longer recognise human or living meaning in the products of his activity, when economic and social determinants constrain her/him bringing about the inability to find a space in the world, then a conflict emerges that makes the schizophrenic syndrome possible. The contemporary world makes schizophrenia possible, not because its techniques render it inhuman and abstract, but because man makes such use of his techniques that man can no longer recognise himself in them. At this point of crisis, faced with the unknown, the individual becomes vulnerable to ideologies and networks of violence. On this basis, Heidegger's existentialism may provide valuable insight into how a conceptual framework can be created to conduct organisational research using complexity theory as a basis.

Cyber Threats, Disruption and National Security Challenges

The Effects on Malaysia and ASEAN

K S Balakrishnan

INTRODUCTION

Disruption has become a catchphrase in recent years. While this current shift towards the digital economy is good for Malaysia and ASEAN given their background in pursuing economic transformation and development, the disruption caused by digitalisation brings about numerous national and regional security challenges. Generally, these security dimensions are not well addressed and discussed in the national circle even though there been some Study Groups being initiated at the regional level via the ARF (ASEAN Regional Forum) and CSCAP (Council for Security Cooperation in the Asia Pacific). Cyber Security Malaysia (CSM) has brought some awareness to the country in recent years. The ARF, for example, has only recently embarked on Cybersecurity Study Group even though CSCAP started the discourse very much earlier. The agenda is also not strong enough in the ASEAN's government circle. Each country has been dealing with it separately amidst some level of recognition in ASEAN meetings. Private sectors and the general public in the region are still grappling with the numerous cybersecurity issues. Lower levels of raising awareness in securing against cyber-attacks can be a problem. Digitalisation can create numerous effects be it in social, political, economic and security dimensions. This article, therefore, is a brief attempt to explain the effect of digital disruption in Malaysia and ASEAN in various sectors. It will deal with how the extensive use of internet, digitalisation and social media revolution affect society in different areas. In addition, how the government of the day attempts to mitigate and cope with these emerging challenges will be also covered.

POLITICAL DISRUPTION AND IMPLICATIONS CAUSED BY DIGITALISATION

Digitalisation brings about both immense economic opportunities and security challenges to a developing country like Malaysia, and the ASEAN region in particular. Former Prime Minister Dato Seri Najib Tun Razak announced in October 2016, that the country will be fully embracing digitalisation and 2017 was declared as the year of Internet Economy of Malaysia. The Malaysian Digital Economy Corporation (MDEC) had been also putting up numerous initiative towards the digitalisation of the economy. In fact, Malaysia started its own Multimedia Super Corridor initiative more than a decade ago. Malaysia's digital economy is currently estimated about at 17.8 per cent in terms of its contribution and in line with the target of 18.2 per cent in 2020 as announced by the government. The Government, through MDEC started quite actively in the creation of digital hubs and digital cafes. It also supported the creation of digital companies and businesses and the development of Big Data Analytics (BDA) talent development program.[33]

The political implications of digitalisation and social media revolution have been ongoing in Malaysia for quite a while. The speed in which it altered politics was only more obviously felt recently. The past three general elections in the year 2008, 2013 and 2018 had witnessed its enormous effect by the way in which it affected the ruling government. Within less than 10 years, the big coalition party that had ruled the country for 61 years was overthrown. Even though this cannot be regarded as a political revolution, the recent election on 9 May 2018 witnessed an unprecedented loss for the huge party known as *Barisan Nasional* (BN) that ruled Malaysia since independence in 1957. Of course many can relate to social media effect and political revolution in cases like the Arab Spring which involved Egypt and its neighbouring states which also spread a bit of pressure in the Middle East.

The use of social media and the lack of control in the cyber realm created an avenue for all kind of news be it fake news or the real news to successfully create hatred on BN style of politics of development, which many political analysts would regard it as money politics and politics of patronage that used to be also ethnically based. Such trend of politics which lasted for

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33 Fairuz Mohd Sahar, "PM: 2017 is the year of Internet economy", *New Straits Times*, 14 October, 2016.

decades were rejected substantially throughout Malaysia in many states. It was unprecedented in the 14th General Election because no one predicted the ruling government to lose about six or seven states. Even one or two states that BN captured simple majority went to the opposition because of party crossover by some MPs of UMNO (United Malay National Organisation).

The use of social media was prominent in the 13th General Election in 2013 too where the DAP (Democratic Action Party) and other opposition party were said to have its own Red Bean Army or cyber troopers which were successful in securing majority of the Chinese community in voting against the government which was regarded as Chinese Tsunami. But BN government won the election in 2013 because of the Malay vote and UMNO's victory, even though the popular vote favoured the opposition.

While there was already talk about Malay Tsunami against the government in the 14th General Election, but the ruling government and Dato Seri Najib was quick to deny prior to the election that such Malay Tsunami will take shape. In fact, it is interesting to note numerous media reports indicated that all the survey, political research, think tanks involved and scholars too, had maintained that a comfortable victory was already in place for the BN party prior to the election. From the time of the National Budget in October 2017, Dato Seri Najib was already announcing the numerous people-friendly projects and financial assistance programs to various segments of the Malaysian society especially those that belong to the B40 (below 40 per cent of the economic strata). The government's massive infrastructure projects involving monorails in Klang Valley, Malaysia-Singapore High-Speed Rail and the East Coast Railway Line (ECRL) were all widely publicised. But ultimate numerous other issues that were publicised in social media involving corruption, the imposition of GST tax and the rising cost of living that determined the final outcome of the election by further denting popular vote in overthrowing the BN government.

Social media revolution involving Facebook, bloggers, twitters and online papers had successfully created an alternative media for the public to fight against the established published media which were own by the ruling political parties of the ruling coalition government. The speed of information circulation and news were overwhelming in which the rivalry was intense. This resulted in the then ruling government to introduce Anti-Fake News Bill in the parliament in March 2018. This is mainly to counter

what the BN government felt was a way to curb what it regarded as fake news and anti-government views which had the tendency to sway support of the public during the upcoming election. But this did not succeed in altering the anger of the public caused by the numerous economic and corruption issues. The present government of the Pakatan Harapan (PH) is planning to revise the Anti-Fake News Bill and also other laws that were approved by the previous government that curbed people's freedom in the name of National Security.

DIGITAL DISRUPTION AND IMPLICATIONS TO NATIONAL SECURITY AND ASEAN REGIONAL SECURITY

The creation of the internet followed by information revolution and digitalisation have tremendous implications for national and regional security. Weaponisation and the tools being used to conduct an attack or crime have all benefitted from the digitalisation including with the aid of sophisticated support of alternative technology (AI). Digitalisation and information revolution had also brought about a Revolution in Military Affairs (RMA). This can be witnessed in the manner in which cyber-attacks and cyber warfare can be now seen as not just a tool of the state or government, but also that can be utilised by individuals and criminal groups. The speed of attack and crimes committed by various parties involved is unimaginable. For example, in cyber warfare, the target can be the critical infrastructures of a country. These include all major communications centres, transport sectors, airport, power sector, water and other strategic resources, banking and so on. Countries that have acquired advanced cyber capabilities have now an advantage of launching cyber-attacks and have an advantage on information warfare too. Criminal groups and individual criminals are also equally in an advantageous position to launch cyber-attacks on a system or various agencies of a country and in business sectors.

The rise in commercially motivated crimes and attacks on banks are on the increase. Data breaching or data stealing is now a common threat to banks and individuals. Commercial and government agency websites are currently under attack. This has become a worldwide problem given the hatred for governments. Commercial sectors are being attacked due to rivalry or the due to the interest of criminal activities caused by individuals or criminal gangs. The rise in mobile phones, laptops, tablets and so on had

made the attacks or hacking activities difficult to be traced because of the nature of mobile platforms being used. Cyber realm is quite complicated because identifying the location of the attacks being made is not easily traceable.

Digitalisation has increased crime rates in the cyber realm quite significantly. In the case of Malaysia, many types of cybercrimes can be analysed as data are being revealed by the police and other cyber-related agencies that monitor cybersecurity. The most famous in Malaysia is Cyber Security Malaysia (CSM), Malaysia Computer Security Response Team (MyCert) of CSM and also the Multimedia Development Corporation (MDEC). Experts from Bots Weekly, CSM and MyCert, claim that 70 per cent of the smart appliances have security weakness. This is a serious as users or consumers and companies that use IT-based smart appliances are under frequent attack. According to the above agencies, there were 9000 counts of cybersecurity issues of all types in 2015 alone. There were 2.7 million counts of botnets, drones, and malware infectious attacks.[34] A survey done by Telenor Group, a telecom company reported that one in five Malaysians are victims of online scams. Online scammers have become sophisticated and are using VOIP (Voice over Internet Protocol) technology to cheat on clients or individuals. National Consumers Complaints agency reported that losses of RM$233.76 million in 2015 and RM$255.62 million in 2016 were caused by all kind of scams.[35]

From the Commercial Crime Investigation Department of the Royal Malaysian Police point of view, commercial crime is also on the increase. Recorded commercial crimes were 19, 509 in 2015, 26, 277 in 2016 and 28, 271 in 2017. Apparently, some 1705 arrested in 2017 in relations to cybercrime. Police had detained 1239 on Macau financial scam and 960 in relations to online purchases crime in 2017 alone. [36] However, CCID maintains that cybercrime has been dropping slowly. There can be an important connection between online business crime and the rise of commercial crime. Financial crime is also generally on the rise. The public often encounter

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34   See Ahmad Khushairi, Editor of Bots Weekly, "Raising Alert on Cyber Security", *New Straits Times*, 2 November, 2016.

35   "Be it true or not be afraid" *Sunday Star*, 25 March, 2018.

36   Press Release of PDRM, Commercial Crime Investigation Department, *The Star*, 27 February, 2018.

losses mainly on financial related crimes. The Macau Scam which was a famous financial scam in Malaysia and the region apparently used some 10, 000 names and personal data. Other types of scam are gold scams, Forex scam and Bitcoin scam. Generally, it involves a few million ringgits annually though it difficult to ascertain the amount as not all public who lose money in such cases come forward to make reports.

Data breaching and stealing of personal information is serious and the aim is also for targeting people into financial scams. Whether we like or not, cybercrimes or cyber scams is now a rampant phenomenon. For 2018 alone, Cybersecurity Malaysia (CSM) points out that 60 per cent of 2060 complaints received are cyber scam related problems. Apparently cyber scams comprised of 1032 cases of the 2060 incidents of complaints from the public and private sectors. Of these hacking was second involving 355 cases of attacks and cyber harassment around 118 cases.[37] Cyberbullying and scams have generally become part of the problem in the internet age society. Eliminating them is almost impossible. This further worsened by the spreading of fake news and so on. Some are purely political and other can be caused by business rivalry and son. Celebrities, too, come under more severe harassment in the information age on little things and it can grow bigger when the issue is a serious one. Damaging the social standing of a famous person is common and faster with digitalisation and the media revolution.

Private companies or the business sector too will be severely affected both in the country and the region. One study points out that companies in the ASEAN region faced US$750 billion (RM$3 trillion) exposure from cyber-attacks and ASEAN needs to spend some US$171 billion (RM$678 billion) between 2017 and 2025 to be in line with the best in the world on cybersecurity.[38] While the amount estimated is debatable, it is obvious that such exposure is a clear warning for businesses and governments in the region that more works need to be done. Both the threats and opportunities are equally big for digitalisation. Generally, threats in using a mobile platform, real-time payment challenges, ATM attacks, account take over, cryptocurrency, malware or ransomware, cyber-espionage and fraud are on the rise when we read on the numerous writing and reports on cybersecurity

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37   Farah Suhaidah, "Cyber Scams on the Rise", *New Sunday Times*, 3 June 2018.
38   "ASEAN companies face US$750 billion exposure from cyberattacks", *Smart Investor*, March, 2018.

and cybercrime.

The banking sector is a constant target for cybercriminals. Data breach and data stealing is an issue. It was reported that the central bank, Bank Negara Malaysia was not spared from an attack while nothing serious happened.[39] In November 2017, the CIMB Bank lost a storage magnetic tapes containing back up data of client information. Police were investigating its IT department employee on the crime committed.[40] Banks are generally under attack world over and Malaysia and ASEAN banking sector is no exception. The security of our personal data is a serious problem. With Facebook's data has been taken advantage by Cambridge Analytica, transfer of data or data breach is so common. It is even dangerous when personal data and national security data or code can be compromised by criminals. The numerous apps that are produced and put out for public consumption are not all that safe and can be subjected to malware and all kind of threats. In recent years drone using cameras are being used by smugglers. Criminals have moved to take advantage the development in the ICT and AI. This makes the job of security enforcement agencies and state apparatus even more difficult to manage national and regional security. Increasingly, big companies like that of Facebook, Uber and so are being caught for data breaching. The effect is not just at national, but also regional and global. India's Ministry of Electronics and Information Technology has recently sent a notice to Facebook on whether its citizen's data has been compromised and sent to Cambridge Analytica which could have influence elections.[41] Target on government agencies using cyber-attacks are generally on the increase.

Regional security cooperation in the cyber security sector is vital like any other counter crime regional police cooperation. Malaysia and ASEAN must deal with the problem in a more regional context. There is a need to set up a Regional Task Force for cybersecurity. ASEAN has numerous mechanism to address the security gap. For example, counter-terrorism police cooperation is already quite established within ASEAN. Terrorism is no longer conducted in the old ways. Terrorists and extremist are actively using the internet and related website for recruitment and funding. Women

39   "BNM faced cyberattack but nothing serious happened", *News Straits Times Online*, 1 April, 2018.
40   "CIMB Bank's loss of storage magnetic tapes", *The Star*, 12 December, 2017.
41   "India sent notice to FB over data breach", *The Star*, 30 March, 2018.

and the younger generation too have become a major victim of terrorism. Malaysia had already arrested more 100 individuals on terrorism in the last two years. Terror groups and leader's use of the cyberspace is on the rise.

The nature of the cyber realm as a platform highly useful for disguise and deceit activities is quite obvious. Tracing terrorists and cybercriminals take a lot more time. On the other hand, it offers an easy platform for a terrorist to prey on victims. Malaysian police revealed that although the crime index in Malaysia reduced by 11.7 per cent in 2017, the fear of safety due to social media and the internet is definitely increasing. Terrorism is one security challenge dimension that is quite obvious. The IS threat is growing and police have arrested some 389 suspects in IS related activities since 2013. Plotting of attacks on non-Muslim worshipping places, kidnapping for ransom and killing is connected to terrorism and groups like IS and others. Police raised the importance of the Counter Messaging Centre that can discredit, deconstruct and demystify propaganda and the negative narratives of the terror groups or extremist who uses social media and so on.[42]

Cyberbullying is another form of threat that is also on the rise in schools and educational institutions. The IT era is good in many ways, but also very helpful for the criminal groups of all kinds including those who are active in organised crime involving drugs, goods and people smuggling. Even though efforts of enforce agencies have been upgraded, cross-border crime has yet to show any form of mass decline in ASEAN. Regional security is constantly challenged in the age of information revolution and digital disruption.

CONCLUSION: RESILIENCE IN THE DIGITAL AGE

Overcoming the challenges coming from the digital shift and social media revolution is not all that simple. Enforcement agencies and legal departments have more work to do on how to mitigate or overcome the problem. Punishing someone whose identity is difficult to trace in the cyber realm is another challenge. Inter-state war can break between countries if intelligence information is not carefully handled. Hackers or attackers can be coming from any place and locate themselves in any country or platform to

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42   Ashwin Kumar, "Country's crime index decreases by 11.7%". *The Sun*, 26 March, 2018.

launch an attack. It is also difficult to identify when the attack is from state motivated agencies like in the cases of Iran, North Korea, Russia or China as often accused or from pure criminal activities of individuals or groups.

Malaysia has adopted numerous laws in order to address security in the cyber realm so that it can be managed well. For example, the Personal Data Protection Act 2010 (PDPA) is supposed to help in regulating the process of personal data in commercial transactions and protect or prevent incidents. Other laws include the Communications and Multimedia Act 1998 (CMA), Computer Crimes Act 1997 (CCA), Digital Signature Act 1997 (DSA), and Electronic Commerce Act 2006 (ECA). Creating laws are one thing, but developing the actual capability to implement, enforce and arrest incidents and criminal require more capacity building. This is where national laws and capacity building alone cannot or would not be able to address cyber challenges effectively. More innovative technological solutions are needed to overcome the challenge of this new realm. Larger investments in capacity building and technological solutions must come from the national, regional and global agencies. This is because problems in the cyber realm have chain effects on social, economic, security and political dimension of not just one country, as it is borderless. A completely new approach and thinking is required. An ASEAN based Regional Task Force is needed urgently to look at the various dimensions of threats posed by digital disruption in order to move the region forward. Inter-regional cooperation too can help by using the platforms of the APEC and EU regions.

Social Media, Disruption and Disinformation

Staying Resilient in the Face of Disinformation Campaigns

Gulizar Haciyakupoglu

INTRODUCTION

"Big Data Will Save Politics" was the headline of the MIT Technology Review's 2013 January issue.[43] The highlighted sub-topics on the cover included "Data Makes Elections Smarter," and "Data puts the soul back into Politics." Fast-forwarding five years, we have learned how harnessing online information, especially social media data, for political gains may provide contradicting results with the optimistic predictions of 2013. In the past couple of years, state-orchestrated information operations (IO), which had disinformation campaigns at their centre, demonstrated that the politics is far from being saved and elections can be outsmarted by, among others, targeted disinformation campaigns. The Cambridge Analytica debacle, and Russia's alleged interference in the 2016 American elections, not only disclosed an old problem that has been swelling under the radar in a more sophisticated form but also exposed states' and societies' vulnerability to comprehensive information operations, including disinformation campaigns. Hence, states' and societies' capacity to stay resilient to disinformation campaigns emerged as a concern.

Social Media, as a tool that fundamentally altered the way in which people process information, sits at the epicentre of this saga. Once praised as the "liberating" tool of the Arab Spring, The Occupy movement and citizen mobilisations that followed, social media is now under scrutiny for the disruptions it brought along with the developments. This article maintains this inquiry by exploring the disruptions facilitated by social media in relation to disinformation campaigns. It proposes a multipronged approach that is updated in pace with the contextual, socio-political and technological changes to build a society resilient to disinformation. Herewith, a section

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43   MIT Technology Review, January 2013, https://www.technologyreview.com/magazine/2013/01/.

discussing information credibility and disinformation in social media will follow this introduction. Then, the following sections will appear respectively: the impact of disinformation on states and society, measures against disinformation campaigns, building resilience against disinformation operations with a multipronged approach and resilience as a long-term objective.

INFORMATION CREDIBILITY AND DISINFORMATION IN SOCIAL MEDIA

The Internet has disrupted traditional means of gatekeeper control over information,[44] and granted masses access to information acquisition and production. With this, people's information consumption, circulation, production as well as evaluation behaviours changed. Moreover, an increase in available information arrived with a surge in disinformation,[45] and evaluation of information credibility became all the more important. In this new information environment, the need to consult external sources of knowledge, including other individuals,[46] to assess the reliability of information increased.[47] Correspondingly, according to 2017 Edelman Trust Barometer, "people are four times more likely to" avoid information that contradicts their stance, they tend to avoid listening to those they disagree with, and they are likely to trust the information coming from "peer[s]."[48]

Within this information atmosphere, social media revolutionised the connection between people and between information. While it opened

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44   Miriam J. Metzger, Andrew J. Flanagin, and Ryan B. Medders, "Social and Heuristic Approaches to Credibility Evaluation Online," *Journal of Communication* 60, (2010): 414, doi:10.1111/j.1460-2466.2010.01488.x.

45   Andy Yee, "Post-Truth Politics and Fake News in Asia," Global Asia 12, no 2 (2017): 68, https://www.researchgate.net/profile/Andy_Yee/publication/318673840_Post-Truth_Politics_and_Fake_News_in_Asia/links/59771de1458515e26d2cdbe8/Post-Truth-Politics-and-Fake-News-in-Asia.pdf.

46   Metzger, Flanagin, and Medders, "Social and Heuristic" 414.

47   Taraborelli (2007) as cited in Metzger, Flanagin, and Medders, "Social and Heuristic" 414. See also Metzger, Flanagin, and Medders, "Social and Heuristic" 414.

48   Richard Edelman, "An Implosion of Trust", In 2017 Edelman Trust Barometer Executive Summary, (2017): 3, https://www.edelmanergo.com/fileadmin/user_upload/Studien/2017_Edelman_Trust_Barometer_Executive_Summary.pdf.

the gates to a wider variety of information[49] and allowed people to connect with peers whom they may consult when assessing the trustworthiness of information,[50] it has been critiqued for harbouring echo chambers that may restrict exposure non-confirming views,[51] and be exploited for targeted disinformation campaigns. Hence, the Cambridge Analytica saga demonstrated that the social media data, including private data, might be harnessed to conduct micro-targeted disinformation campaigns and might serve malicious actors in nudging people's biases. In addition to the organisations like Cambridge Analytica, individuals or content farms may also exploit the freely available technology, and reach masses with targeted content. 18-years-old Macedonian[52] and 24-years-old Romanian's[53] reach to vast audiences with the stories they fabricated during the 2016 American Elections is an example to this.

THE IMPACT OF DISINFORMATION ON STATE AND SOCIETY

Disinformation campaigns, state-orchestrated ones, in particular, impact the state and society in multiple ways. One of the threats that have been in the limelight of discussions since the 2016 American elections is disinforma-

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49 Nic Newman, "Overview and Key Findings of the 2017 Report", 2017 Digital News Report, 2017, http://www.digitalnewsreport.org/survey/2017/overview-key-findings-2017/. See Also Eytan Bakshy, Solomon Messing, and Lada A. Adamic, "Exposure to Ideologically Diverse News and Opinion on Facebook", Science 348, issue 6239, (2017): 1130–1132, https://isps.yale.edu/sites/default/files/files/Exposure%20to%20Ideologically%20Diverse%20News%20and%20Opinion%20on%20Facebook.pdf.

50 Metzger, Flanagin, and Medders, "Social and Heuristic".

51 Kiran Garimella, Gianmarco De Francisci Morales, Aristides Gionis, and Michael Mathioudakis, "Political Discourse on Social Media: Echo Chambers, Gatekeepers, and the Price of Bipartisanship", in WWW 2018: The 2018 Web Conference, April 23–27, 2018, Lyon, France. ACM, New York, NY, USA, https://doi.org/10.1145/3178876.3186139. See Also Michela Del Vicario, Gianna Vivaldo, Alessandro Bessi, Fabiana Zollo, Antonio Scala, Guido Caldarelli, and Walter Quattrociocchi, "Echo Chambers: Emotional Contagion and Group Polarisation on Facebook", Scientific Reports 6, 2016, doi:10.1038/srep37825.

52 Samanth Subramanian, "Inside the Macedonian Fake-News Complex", *Wired*, February 15, 2017, https://www.wired.com/2017/02/veles-macedonia-fake-news/.

53 Hunt Allcott and Matthew Gentzkow, "Social Media and Fake News in the 2016 Election", *Journal of Economic Perspectives* 31, number 2 (2017): 217, https://web.stanford.edu/~gentzkow/research/fakenews.pdf.

tion campaigns' threat to the well-functioning of democracies and electoral systems.[54] The risks outlined by various sources or transpired as examples stretch from the defamation of political figures, companies, and institutions[55] by way of "misleading information" to the exploitation of the term fake news to discredit challenging information, as allegedly practised by Donald Trump.[56] Disinformation campaigns may even lead to physical attacks. The Pizza Gate incident is a case in point. Furthermore, different parties, including some of the presenters to the Select Committee on Deliberate Online Falsehoods in Singapore,[57] have presented disinformation campaigns as a risk to the social, religious, political and ethnic harmony of the states.[58] Akin to this concern, the 2017 Reuter's Institute Digital News Report identified "political polarisation" and "media bias," *which may be exploited by disinformation campaigns*, as sources of mistrust.[59] For instance, in Indonesia, before the 2017 Jakarta Gubernatorial elections, disinformation targeted at religious and racial differences were in circulation. Examples included the

54   "Russian disinformation distorts American and European democracy", *The Economist*, February 22, 2018, https://www.economist.com/news/briefing/21737297-mueller-indictment-reveals-some-kremlins-tactics-russian-disinformation-distorts.

55   Andy Yee, "Post-Truth Politics and Fake News in Asia", Global Asia 12, no 2 (2017): 68, https://www.researchgate.net/profile/Andy_Yee/publication/318673840_Post-Truth_Politics_and_Fake_News_in_Asia/links/59771de1458515e26d2cdbe8/Post-Truth-Politics-and-Fake-News-in-Asia.pdf.

56   Robinson Meyer, "Why It's Okay to Call It "Fake News"," The Atlantic, March 9, 2018, https://www.theatlantic.com/technology/archive/2018/03/why-its-okay-to-say-fake-news/555215/.

57   Nur Asyiqin Mohamad Salleh, "Taping into race, religion to spark reactions", *The Straits Times*, March 17, 2018, http://www.straitstimes.com/politics/tapping-into-race-religion-to-spark-reactions. See Also Lester Hio, "Disinformation campaign could be the first step in attacking Singapore: K. Shanmugam", March 14, 2018, http://www.straitstimes.com/singapore/disinformation-campaign-could-be-the-first-step-in-attacking-singapore-shanmugam.

58   Adam Entous, Craig Timberg and Elizabeth Dwoskin, "Russian operatives used Facebook ads to exploit America's racial and religious divisions", *The Washington Post*, September 25, 2017, https://www.washingtonpost.com/business/technology/russian-operatives-used-facebook-ads-to-exploit-divisions-over-black-political-activism-and-muslims/2017/09/25/4a011242-a21b-11e7-ade1-76d061d56efa_story.html?utm_term=.09432a3871d7.

59   Nic Newman, Richard Fletcher, Antonis Kalogeropoulos, David A. L. Levy and Rasmus Kleis Nielsen, "Reuters Institute Digital News Report 2017," (2017):9, https://reutersinstitute.politics.ox.ac.uk/sites/default/files/Digital%20News%20Report%202017%20web_0.pdf?utm_source=digitalnewsreport.org&utm_medium=referral. *Emphasis added.*

allegations of Chinese workers "taking over locals' jobs,"[60] and the "edited" video and transcript of Jakarta's former governor's "campaign speech," which raised fury for "denigrating Quran."[61] Similarly, disinformation circulated in social media allegedly fuelled hate-crimes in Sri Lanka.[62] Amplification of examples of disinformation campaigns concerns the public. According to the 2018 Edelman Trust Barometer, 7 in 10 people are concerned about the weaponisation of fake news.[63]

Worries and examples are grounded. However, it is hard to measure the scale of the effect and identify the network behind orchestrated disinformation campaigns. Furthermore, the impact of disinformation campaigns, especially when orchestrated by a state, cannot be evaluated in isolation from other methods of information operations (IO) (e.g., hacking, espionage, etc.). Different IO measures may be put in operation simultaneously and they may contribute to the manipulation of public opinion and psychology collectively. Indeed, while there is a greater focus on the disinformation aspect of the issue of Russia's meddling of the American elections, the case also involved the hacking of Democratic National Committee emails[64] and

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60　Erwida Maulia, "Fake news charges emotionally driven Jakarta election," Nikkei Asian Review, February 13, 2017, https://asia.nikkei.com/Politics-Economy/Policy-Politics/Indonesian-fake-news-spread-ahead-of-Jakarta-election.

61　Yenni Kwok, "Indonesia's Worsening Problem of Fake News", Time, January 6, 2017, http://time.com/4620419/indonesia-fake-news-ahok-chinese-christian-islam/.

62　Vindu Goel, Hari Kumar and Sheera Frenkel, "In Sri Lanka, Facebook Contends With Shutdown After Mob Violence", *The New York Times*, March 8, 2018, https://www.nytimes.com/2018/03/08/technology/sri-lanka-facebook-shutdown.html. See also Amanda Taub and Max Fisher, "Where Countries Are Tinderboxes and Facebook Is a Match", *The New York Times*, April 21, 2018, https://www.nytimes.com/2018/04/21/world/asia/facebook-sri-lanka-riots.html?

63　2018 Edelman Trust Barometer Global Report, Edelman, (2018): 16, http://cms.edelman.com/sites/default/files/2018-02/2018_Edelman_Trust_Barometer_Global_Report_FEB.pdf.

64　Julian Borger, "Russia hackers discussed getting Clinton emails to Michael Flynn – report", *The Guardian*, June 30, 2017, https://www.theguardian.com/us-news/2017/jun/30/russia-hackers-clinton-emails-mike-flynn. See Also, Ed Pilkington, "FBI refuses to disclose documents on Trump's call to Russia to hack Clinton", The Guardian, May 11, 2017, https://www.theguardian.com/us-news/2017/may/11/justice-department-fbi-documents-trump-russia-hack-clinton-email.

allegations of collusion between Russia and the Trump campaign.[65,66]

The complexity of the network of IO, the difficulty of measuring the impact and trouble of identifying the perpetrators emerge as hurdles in the definition and solution of the problem. What is more, trust in media, institutions, state and NGO's are put to the test amidst the rise in disinformation. The inadequate level of confidence in media and the government[67] are profoundly concerning as these two entities have a great responsibility in tackling the issue. Despite the obstacles, with increasing recognition of the threat posed by the disinformation campaigns, states, and other parties have been exploring various measures against disinformation campaigns.

MEASURES AGAINST DISINFORMATION CAMPAIGNS

States and other parties (e.g., industry, NGOs, citizens, etc.) have taken various measures to combat disinformation campaigns. Proposed solutions include legislation, the establishment of agencies, media literacy-related initiatives, fact-checking endeavours, international collaboration (including newsroom initiatives), and research group projects.

Germany is one of the first states to implement a legal action targeted at disinformation campaigns. The Network Enforcement Act (NEA) holds social media companies accountable for the disinformation posted on their

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65   Nicholas Fandos, "Despite Mueller's Push, House Representatives Declare No Evidence of Collusion", *The New York Times*, March 12, 2018, https://www.nytimes.com/2018/03/12/us/politics/house-intelligence-trump-russia.html.

66   The House Intelligence Committee Republicans stated that they "found no evidence of collusion" in their investigation (See Nicholas Fandos, "Despite Mueller's Push, House Representatives Declare No Evidence of Collusion", *The New York Times*, March 12, 2018, https://www.nytimes.com/2018/03/12/us/politics/house-intelligence-trump-russia.html.). However, Robert Mueller's "Russia indictment" revealed exchanges between the "conspirators" and "unwitting members, volunteers and supporters of the Trump campaign," while refraining from labelling "any US citizen as alleged co-conspirators" (See Tom McCarthy, "Ten key takeaways from Robert Mueller's Russia indictment", The Guardian, February 16, 2018, https://www.theguardian.com/us-news/2018/feb/16/russians-indictment-mueller-charges-fbi-investigation-what-are-they.)

67   2018 Edelman Trust Barometer Global Report, Edelman, (2018): 5, http://cms.edelman.com/sites/default/files/2018-02/2018_Edelman_Trust_Barometer_Global_Report_FEB.pdf.

platforms and forces them to remove disinformation to avoid penalty.[68] The act has already received criticism related to the deleted content and for "outsourcing" the responsibility of "judicial bodies" to "private companies."[69] Despite criticism, other countries are likely to jump on the bandwagon. Malaysia has already approved an Anti-Fake News law[70] and Italy,[71] Croatia[72] and France[73] are some of the countries exploring legislative action against disinformation campaigns. Additionally, the United Kingdom, Australia, [74] and Singapore formed select committee's to examine the problem of disinformation campaigns further. Singapore's Select Committee recently received public submissions and held hearings on the issue.[75]

The number of countries gearing toward legislative action is increasing. However, legal action may prove inefficient in alleviating the problem of disinformation. It is difficult to locate the perpetrator of deliberate online falsehoods, and demarcate what online falsehoods (or the variants fake news, disinformation, etc.) entail, especially when there is not any unanimously

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68 Gulizar Haciyakupoglu, Jennifer Yang Hui, V S Suguna, Dymples Leong, Muhammad Faizal Bin Abdul Rahman, "Countering Fake News: A Survey of Recent Initiatives", S. Rajaratnam School of International Studies Policy Report, (2018): 3, http://www.rsis. edu.sg/wp-content/uploads/2018/03/PR180307_Countering-Fake-News.pdf.

69 Philip Oltermann, "Tough new German law puts tech firms and free speech in spotlight", The Guardian, January 5, 2018, https://www.theguardian.com/world/2018/ jan/05/tough-new-german-law-puts-tech-firms-and-free-speech-in-spotlight.

70 "Malaysia's anti-fake news legislation becomes law, is now enforceable", *The Straits Times*, April 11, 2018, http://www.straitstimes.com/asia/se-asia/malaysias-anti-fake-news-legislation-becomes-law-is-now-enforceable. See Also Hannah Beech, "As Malaysia Moves to Ban "Fake News, "Worries About Who Decides the Truth", The New York Times, April 2, 2018, https://www.nytimes.com/2018/04/02/world/asia/ malaysia-fake-news-law.html.

71 Ernesto Apa and Marco Bassini, "Italy: Legislative proposal on fake news", IRIS Merlin, 2017, http://merlin.obs.coe.int/iris/2017/5/article27.en.html.

72 Daniel Funke, "A guide to anti-misinformation actions around the world", *Poynter*, March 14, 2018, https://www.poynter.org/news/guide-anti-misinformation-actions-around-world.

73 Pascal-Emmanuel Gobry, "France's "Fake News" Law Won"t Work", Bloomberg, February 15, 2018, https://www.bloomberg.com/view/articles/2018-02-14/fake-news-france-s-proposed-law-won-t-work.

74 Haciyakupoglu, Hui, Suguna, Leong, Rahman, "Countering Fake News", 17.

75 "Select Committee on Deliberate Online Falsehoods – Causes, Consequences and Countermeasures", Parliament of Singapore, https://www.parliament.gov.sg/ sconlinefalsehoods.

accepted definition.[76] Laws may not be flexible enough to respond to the technological and procedural sophistication of disinformation campaigns.[77] Legal action may remain limited in responding to the global nature of the problem as a local solution,[78] and to the underlying "structural problems" seated in "social" fabric and media. [79] These factors may pave the way for an uncalculated application of the law or the emergence of loopholes for offenders to exploit.[80]

Legal action is not the only solution in store. Non legislative actions that have been implemented include (a) fact-checking initiatives (e.g., ClaimBuster, *Politifact*, *News Helper*, Cross Check, (b) Government affiliated fact-checking sites (e.g., Qatar, Malaysia, etc.), etc.), (c) research-oriented approaches (*Duke Reporters' Lab, Oxford Computational Propaganda Project*), (d) agencies working on the issue (Czech Republic – Centre for Combating Terrorism and Hybrid Threats, Indonesia – Multimedia Bureau (under Police), USA – Global Engagement Center), (e) independent multi-functional bodies (e.g., StopFake) or newsroom oriented initiatives (e.g., First Draft), (f) media literacy related endeavours undertaken by countries (Italy, Taiwan, Finland, etc.), and (g) international-collaborative actions (e.g., East StratCom Task Force (European Union), International Fact Checking Organisation, etc.).[81]

These measures are also not free of problems. For instance, fact-checking sites may remain limited in reaching "fake news" consumers,[82] with one reason being selective exposure to information that confirms one's biases.

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76 Haciyakupoglu, Hui, Suguna, Leong, Rahman, "Countering Fake News", 12. See also Alberto Alemanno, "Editorial: How to Counter Fake News? A taxonomy of Anti-fake News Approaches", European Journal of Risk Regulation 9, (2018): 2, doi: 10.1017/err.2018.12.

77 Haciyakupoglu, Hui, Suguna, Leong, Rahman, "Countering Fake News", 12.

78 Haciyakupoglu, Hui, Suguna, Leong, Rahman, "Countering Fake News", 12.

79 Alemanno, "Editorial: How to Counter Fake News? A taxonomy of Anti-fake News Approaches", European Journal of Risk Regulation 9, (2018): 5, doi: 10.1017/err.2018.12.

80 Haciyakupoglu, Hui, Suguna, Leong, Rahman, "Countering Fake News", 12.

81 Haciyakupoglu, Hui, Suguna, Leong, Rahman, "Countering Fake News", 9, 19, 20. Emphasis added.

82 Andrew Guess, Brendan Nyhan, and Jason Reifler, "Selective Exposure to Misinformation: Evidence from the consumption of fake news during the 2016 US presidential campaign," (January 9, 2018): 2, https://www.dartmouth.edu/~nyhan/fake-news-2016.pdf.

Correspondingly, people tend to trust the news they consume more than news in general.[83] This optimism may lead information consumers to be less critical about the information they select while even a fact-based article has to be critiqued for its perspective as the problem with disinformation stretches beyond the fabrication of information and concerns other deliberately manipulated information including half-truths and decontextualised information. Also, fact-checking sites provided by the government may attract criticism for covering issues with a bias in favour of the government. On the other hand, non-governmental agencies may fail to afford a full-fledged response to the problem due to the restrictions to the information they have in hand when compared with government's access to information, *including intelligence*, and because of their pace of response to the issue,[84] and limits to their sanctioning power.

The solutions in place are not free from loopholes. However, despite the shortages, they serve as early interventions. Besides, improvement of the methods and technologies of disinformation campaigns may render some solutions outdated in the long run. Under the circumstances, to close the gap, it is necessary to embrace a multi-pronged approach that builds on the existing proposals, and continually enhance resolutions and proceedings according to the developments in the area.

BUILDING RESILIENCE AGAINST DISINFORMATION WITH A MULTIPRONGED APPROACH

The Centre of Excellence for National Security (CENS)[85] provided a framework to combat disinformation campaigns upon reviewing global legal and

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83   Rasmus Kleis Nielsen and Lucas Graves, "News you don"t believe: Audience perspectives on fake news", Reuters Institute, (October 2017): 6, https://reutersinstitute.politics.ox.ac.uk/sites/default/files/2017-10/Nielsen%26Graves_factsheet_1710v3_FINAL_download.pdf.

84   Singapore Parliament, Select Committee Hearing on Deliberate Online Falsehoods – Causes, Consequences and Countermeasures, March 14, 2018, 1st session, hearing of Soon Wan Ting Carol and Shawn Goh Ze Song. Citation refers to the responses of the committee to Dr. Soon's remark on establishing an agency. Notes of the hearing were taken in the parliament during the session.

85   The Centre of Excellence for National Security (CENS) is a division under S. Rajaratnam School of International Studies (RSIS) at Nanyang Technology University (NTU).

non-legal endeavours against disinformation. This section builds on CENS's framework, and expands on its proposals, especially on the collaboration aspect (see 5.1). The framework entails pre-emptive, immediate and long-term responses. It is necessary to revise the responses on a constant basis as the measures of disinformation campaigns continue to advance, conditions change, and the impact of solutions transpire over time.

The primary component of the pre-emptive measures is the issue-focused approach, which suggests devising solutions based on the question of focus such as elections.[86] The election-oriented efforts against fabricated information during the German and French elections can be taken as examples.[87] For instance, Facebook published the methods to discern accurate information online in local newspapers in France,[88] and collaborated with the "German Federal Office for Information Security."[89] Also, there were information "monitoring" efforts carried under the banner of #WahlCheck17 in Germany and CrossCheck in France.[90] In Germany and France, factors other than issue-focused initiatives and collaboration (e.g., greater awareness, media literacy skills) might have had an impact on the magnitude of the effect of fictitious information in circulation. However, the issue-focused approach to disinformation could have alleviated the difficulty of defining what disinformation entails in the given context, accelerated the pace of response, and congregated various efforts over an immediate concern.[91] The issue-focused response against fake news may be employed in contexts other than elections such as a humanitarian crisis or social movements.

Immediate response has crisis communication and fact-checking at its centre. Having a crisis communication plan may expedite the allocation of

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86   Haciyakupoglu, Hui, Suguna, Leong, Rahman, "Countering Fake News", 12.
87   Haciyakupoglu, Hui, Suguna, Leong, Rahman, "Countering Fake News", 12.
88   Marie Mawad, "French Election Is Facebook's Fake News Litmus Test", *Bloomberg*, April 27, 2017, https://www.bloomberg.com/news/articles/2017-04-27/france-is-facebook-s-fake-news-litmus-test-as-elections-near-end.
89   Josh Constine, "11 ways Facebook tried to thwart election interference in Germany", *Techcrunch*, September 28, 2017, https://techcrunch.com/2017/09/27/facebook-election-interference/.
90   Claire Wardle, "#WahlCheck17: Monitoring the German election", *First Draft*, September 1, 2017, https://firstdraftnews.org/wahlcheck17-correctiv/.
91   Haciyakupoglu, Hui, Suguna, Leong, Rahman, "Countering Fake News", 12. *Emphasis added.*

responsibilities in times of emergency (e.g., identifying truth, communicating to the public, internal communication, etc.), accelerate the response and allow the escalation of the problem according to the pre-planned procedures. Having continuous, transparent communication and trust between communicators and audiences in place would facilitate crisis communication. This, among others, requires the reinstitution of the attention to and "respect for facts and objective analysis" and the elevation of trust in institutions, especially the government and media, which were once regarded as the bastions of accurate information. [92] Additionally, despite the problem of selective attendance, fact-checking measures could supplement crisis communication measures and serve as a first-hand warning on the initial contact with fabricated information.

Long-term measures include media literacy initiatives, building social norms and collaboration. Media Literacy is of particular importance in today's information sphere, as enhancing people's capacity to discern accurate information is a significant step in solving the problem. Countries such as Canada, Finland, Taiwan, and Italy have taken steps to introduce media literacy into their school programme.[93]Instituting social norms on responsible information consumption and sharing (e.g., information verification, reading to the full extent, questioning, etc.) may also prove effective. An example of a social norm in cyberspace is the adherence to a chat group accepted communication rules and exclusion of group members who do not respect the norms of the chat group.[94] Akin to this, netizens may be discouraged to share or manufacture disinformation, and encouraged to verify the information they consume and share via norms accepted as standards of trust-based communication. Sharing accurate information and scrutinising the accuracy of information, even when the information confirms preconceived opinions, has to be internalised, especially when the impact of cognitive biases on information selection is concerned.

92   Jennifer Kavanagh and Michael D. Rich, "Truth Decay: An Initial Exploration of the Diminishing Role of Facts and Analysis in American Public Life", *the RAND Corporation*, (2018): 27, 28, 29, 33, 50, 73,74, https://www.rand.org/content/dam/rand/pubs/research_reports/RR2300/RR2314/RAND_RR2314.pdf.

93   Haciyakupoglu, Hui, Suguna, Leong, Rahman, "Countering Fake News", 7, 19.

94   Ang Peng Hwa, "Framework for Regulating the Internet", in *The Internet and Governance in Asia: A Critical Reader*, ed. Indrajit Banjee (Asian Media Information and Communication Centre (AMIC) and Wee Kim Wee School of Communication and Information Nanyang Technological University (WKWSCI-NTU):2007, 328, 329, 330.

COLLECTIVE WORK IS ESSENTIAL AT EVERY STAGE

From pre-emptive measures to the long-term solutions, domestic and international collaboration has to happen at every stage of the fight against disinformation campaigns. The CENS framework outlines cooperation between government and industry, extra-governmental cooperation (including citizens), and regional or transnational teamwork among governments. Hence, the developments since the publication of the framework necessitate further expansion of the collaborative measures, especially the cooperation between the citizens and the state.

Government-industry collaborations can be expanded into constant knowledge and skill exchanges between relevant parties on issue basis (e.g., elections, humanitarian crisis, instituting media literacy collaboratively, etc.). The extra-governmental collaboration may allow for an action that is not restricted by state bureaucracy, and in addition to other parties, it may further engage citizens in the fight against online falsehoods. One example is the First Draft, which is a coalition formed by - among others – technology companies (e.g., Google, Twitter, Facebook), research institutions (e.g., Tufts Fletcher School, Public Data Lab, etc.), and newsrooms (e.g., The Guardian, Reuters, etc.). StopFake, which fights Russian disinformation together with partnering IT professionals, journalists, and translators via opinion pieces, videos countering disinformation, and providing access to research[95] is another example.

The information that surfaced with the Cambridge Analytica debacle and Facebook hearings further unveiled citizens' vulnerability to the disinformation campaigns. These recent developments call for a greater emphasis on citizen engagement in decision-making on the steps to be taken against disinformation campaigns. This is of particular importance when citizens' position as the victim as well as the perpetrator of disinformation[96] creation and circulation are concerned. Some of the platforms that facilitate citizen

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95 About us, *StopFake.org*, accessed November 28, 2017, https://www.stopfake.org/en/about-us/.

96 Citizens not only consume disinformation, but some also circulate it. Also, as demonstrated by the Macedonian and Romanian content fabricators for the American elections, individuals may manufacture fictitious content for monetary gains. They may even be recruited as cyber trolls by governments, as suggested by the Freedom House report, which identified 30 countries with such forces.

engagement in decision-making may be adapted to the issue of disinformation campaigns. vTaiwan and Pol.is, which cooperate to integrate citizens into decision-making, are two such promising platforms. vTaiwan is a platform that allows citizens to acquire information and direct their questions to government officials.[97] Pol.is draws "maps of public opinion" via associating a vast amount of online communication.[98] These two mediums may help understand citizens' approaches to disinformation, devise solutions collaboratively, and establish ongoing, transparent communication with citizens.

Collaborations among governments are crucial in the face of increasing foreign government interference in the politics of different nations via information operations, including disinformation campaigns. NATO's Strategic Communication Centre of Excellence and European Union East StratCom Task Force are two examples of regional collaboration efforts that are concerned with the operations wages against people's minds. Such efforts could be expanded into different regions, and an overarching global forum for discussion could be scheduled to meet on a yearly basis for information and skills exchange, and for alignment. Here, in addition to the information in CENS's framework, a clash of interests among different participants may hamper international collaboration. Thus, it is necessary to draw on the risks all countries may face and unite by common threats in the first stage of collaboration. Ideally, these collaborations should not be restricted to the developed countries and should aim at elevating the conditions in countries that lack the adequate skill pool and technological infrastructure. This is because disruption will not happen at the same speed in different nations and the destruction will not hit every country in the same magnitude.

Moving forward, the cautions taken against disinformation campaigns, technological capacity and human capital available to surpass this challenge, and responsibilities internalised by the states may differ widely across countries. The potential discrepancy between countries' power over technology companies, country-based disparities in financial, social and political

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97   Kate O"Flaherty, "Fighting fake news: societies using technology to search for truth", *The Guardian*, March 15, 2017, https://www.theguardian.com/public-leaders-network/2017/mar/15/fighting-fake-news-societies-technology-search-truth.

98   Tom Simonite, "The Internet Doesn"t Have to Be Bad for Democracy", *MIT Technology Review*, June 2, 2017. https://www.technologyreview.com/s/607990/the-internet-doesnt-have-to-be-bad-for-democracy/. See Also "Crowdsourcing Legislation," *Pol.is.*, accessed January 9, 2018, https://pol.is/home.

climate accommodating the developments and solutions, and differences in openness to change and adaptability to solutions between societies may result in variances in the nature of, approaches to and the impact of disinformation campaigns between countries. These disparities may render some countries more vulnerable to disinformation campaigns. For instance, countries with weak or no data privacy laws may become fertile information harvesting grounds while the citizen data of other countries are better protected. On the other extreme, some countries may become recruitment grounds or launch pads for other states' disinformation campaigns. These risks render cross-country collaboration all the more necessary.

RESILIENCE AS A LONG-TERM IDEAL

Disinformation and its kin (e.g., propaganda) have been contaminating the information sphere in different forms and magnitudes.[99] However, the disruptions brought by the advancement of communication technologies, including social media, elevated the methods and reach of disinformation, rendered people more vulnerable to disinformation campaigns, and paved the way for the further contamination of the information domain. Under the circumstances, it is essential to embrace a multi-pronged approach and tailor flexible solutions that acclimatise to changing conditions and that people can adapt with ease. Collaboration within nations and among different countries is a significant component of this multi-pronged approach as the interpenetration of IO and disinformation campaign methods, and a potential surge in the weaponisation of disinformation campaigns in the international arena demand knowledge and skill exchange, and joint action.

Disinformation will likely continue to plague the information domain in more sophisticated forms with the further advancement of the methods of and technology supporting disinformation campaigns, despite the efforts to eradicate it and a possible decrease in its circulation. Hence, resilience to disinformation campaigns should not be measured against the containment of disinformation, although it is necessary. Resilience against disinformation campaigns is a long-term objective for countries to work towards collaboratively.

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99   Kumar Ramakrishna, "Disinformation and Fake News: Old Wine in New Bottles", RSIS Commentary, March 27, 2018, http://www.rsis.edu.sg/wp-content/uploads/2018/03/CO18054.pdf.

Self-Disclosure on Social Media in Brunei Darussalam

Siti Mazidah Haji Mohamad

Online presence in Brunei Darussalam is not an uncommon sight. Sixty-nine per cent of the total population in Brunei is connected to social media monthly and there is a growing individuals' disposition to self-disclosure on popular social media platforms such as Instagram, Facebook and Twitter. Unchecked self-disclosure can result to overexposure of one's identity, making the users susceptible to series of cybercrimes such as fraud, blackmail, and potentially prostitution, which not only could jeopardise the users' privacy but could also cause public disorder and disturbance at large. Such a disposition can be considered as one of the disruptive factors to the nation's security and stability.

INTRODUCTION

As technology and internet progress, we continue to witness the growing number of individuals going online and a plethora of everyday experiences being shared online, which has led to the blurring of private and public spheres. Academics, government and non-governmental institutions, police forces and legislators are always concerned with what the internet growth and development can bring to the general population, which is not a surprise considering the growing cases on cyber-crimes such as identity theft, fraud, online grooming by paedophiles, email scams, phishing, and terrorism in cyberspace. These crimes occur at different scales and most often are transboundary in nature. This growing worry on privacy in the online contexts is reflected in the expanding academic works of literature on privacy and online behaviour, such as the studies on how users behave when social network sites such as Facebook are set to deliver, erode their privacy and also, the effect of privacy issues on self-disclosure and also amongst the general public. Self-disclosure refers to the action of sharing or disclosing our information to others, which is an essential communicative practice to

initiate and maintain both bridging and bonding relationships.

New social media allow users to share information easily and instantaneously. The affordances such sites offer have resulted in easy sharing and accessibility of information. These growing self-disclosure practices are putting the users at potential risk – data being taken and re-used whether they are used intentionally or unintentionally, which may result in the breach of an individual's privacy. In Brunei, 190 people have become victims to cybercrime in 2016 and this rose to 207 people by mid-November 2017. Among the 207 people, 123 people were between the aged 18 to 35 years old. Cyber-crime and fraud through social media are among the latest challenges faced by the police in maintaining public order in the country.

The associated potential risk and emerging privacy concerns are dependent on a number of factors including the user's own definition of privacy, the audiences with whom the information has been shared, and the society's view of the concept of private and public. Due to these factors combined, for an individual, the practice of self-disclosure online and the associated risks may not necessarily be considered as a potential disruptor to one's everyday life. Rather, self-disclosure on social media is accepted as part of today's social life and is essential for maintaining relationships with others and that the risks of their information being reposted, for instance, are considered acceptable. Therefore, it is crucial to have a grounded approach in understanding users online social practices, and their privacy issues in relation to online interactions and engagements.

The questions to ask are: how much can we disclose; and how much should we disclose? Self-disclosure is vital to maintaining relationships but oversharing puts the user at risk of disclosing their private life to the public. One's definition of privacy shaped by new social practices online has an implication on the future of internet development-related policies, acts and legislation. What is equally important in these online interactions apart from the user sharing information is the audience who rework images and narratives within their own socio-cultural context; therefore, also making meaning of the information received accordingly and potentially taking information disclosed by others out of the context.

By focusing on Bruneians' media use and engagement through their everyday self-disclosure at the individual level as a preliminary case-study and directing the focus on online privacy contexts, the findings will help

the academics, government and non-governmental institutions, and legislators to further understand the elusiveness and the complexity of the notion of privacy. Such an individual and micro approach to understanding self-disclosure and privacy, when reconsidered in the context of building resilience in the face of disruptions, will be useful in the drafting of fitting and contextual preventative measures, investigative procedures, and legal framework to deal with the emergent and growing cyber threats in today's globalised and connected world.

## SELF-DISCLOSURE PRACTICES IN BRUNEI DARUSSALAM

Brunei Darussalam's digital social transformation today has led the author to spearhead preliminary research between 2016–2017 that focused on how and what people disclose online and their understanding of online privacy. This research aims to contextualise and conceptualise online privacy in the Bruneian context and finally, to draft fitting policy/law for privacy online that takes into consideration the Bruneian context. The main aims of the research were: to elicit Bruneians' understanding of privacy; to explore Bruneians everyday experiences online focusing on privacy and its issues; to investigate the contexts associated with privacy and its issues in Bruneians everyday new media and engagement and to offer the list of privacy concerns (contextualised) for law/policy drafting. As this research is at a preliminary stage, the author is not offering a representation of Bruneians' online use but to share initial findings relevant to youth's everyday self-disclosure for us to think about the growing social practices online and awareness of our own online privacy and their relevance to today's laws/legislation on online use. A total of 185 surveys were collected from 135 females and 50 males, supplemented by 17 semi-structured interviews and observation conducted on social media sites used by Bruneians between the age 13 – 40 from mixed ethnic and religious groups. The respondents are dominated by those in the age group 20 – 24 (49.6% of total respondents).

According to We are Social[100], Brunei has the highest percentage of monthly active users of popular social media in the Southeast Asian region. In 2015, 69% of its total population was active on social media followed by

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100   Simon Kemp, "Digital, Social and Mobile in 2015", *We Are Social*, January 20, 2015, <https://www.slideshare.net/wearesocialsg/digital-social-mobile-in-2015

Singapore with 67% of active users compared to the total population. In addition to this, Instagram is one of the highly used social media sites in the country, with 87% of active users compared to the total population[101]. This use of Instagram is also reflected in this research's finding (Figure 1). Instagram and YouTube are the two top social media sites used by the respondents of the study, followed by WhatsApp (70% and 76% for Male and Female respectively). Instagram is the highly used among the respondents possibly due to the varieties of features the site offers such as Live Video, multiple photo upload and video sharing capability, which offers its users more affordances in communicating with others. Figure 2 shows socialising with others as the main purpose of using social media in the country followed by using social media due to trends, official purpose, file sharing and others. Therefore, it is not surprising to see users sharing banal day to day activities, experiences, and mood on social media as this self-disclosure practice is essential for communication and socialisation, as previously mentioned.
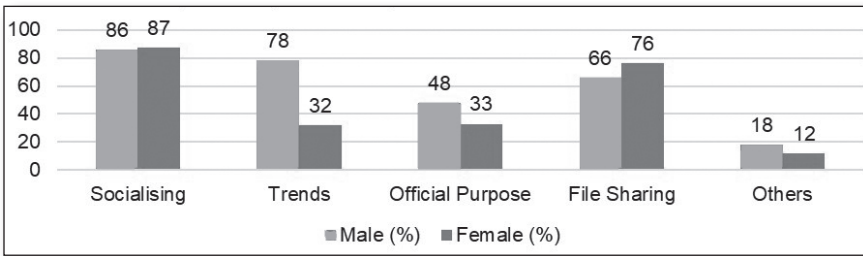
FIGURE 1
Social media sites usage in Brunei Darussalem
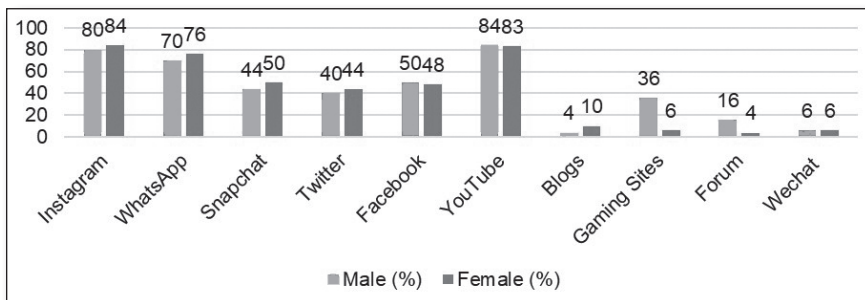
Source: Author's Research Findings

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101 Azlan Othman, "Surge in mobile phone, broadband penetration in Brunei" *Borneo Bulletin*, August 8, 2017, https://borneobulletin.com.bn/surge-mobile-phone-broadband-penetration-brunei/

FIGURE 2
Purpose of using social media in Brunei Darussalem

Source: Author's Research Findings

BOX 1
Interview response on social media sharing

"I feel comfortable expressing my opinion here (Twitter)"

"I update about myself but not that often/I share my interest – commenting about celebrities and dramas. I am more expressive on Twitter (opinion)"

"I am using it (Instagram) for socialising and online shopping. But I prefer to not share my opinion here. I focus on the presentation of photos before uploading it "

Source: Author's Research Findings

The interview excerpts in Box 1 show that users are generally open to sharing an opinion, everyday activities in the form of photos and texts with their followers. It can be observed from the interview and survey that what respondents consider as acceptable to be shared on social media is an individual preference. Figure 3 below shows the different types of information shared on social media that include personal opinion, social activities, photo/video upload, contact, location and personal information. Respondents' view varies on what they disclose online and interestingly, there is a gender difference in what the respondents think of what is acceptable to be disclosed. It is more interesting to see how female respondents are more

open to sharing location as well as contact information with their followers. This observation from Figure 3 is connected to the users' privacy awareness presented in Figure 4. More than half of the respondents are aware of the potential risk to their privacy and that they are aware of the availability of the privacy settings to protect their information. However, we found out that despite knowing the availability of those setting the usage is quite low amongst the male. As for the females, 93% of the respondents have utilised the privacy setting offered on their social media sites. This utilisation of privacy settings helps to protect one's self and allow the users to disclose more information online. Perhaps, this is the reason for the 85% and 75% of the female respondents (in Figure 3) to consider sharing contact and location information as acceptable respectively.

FIGURE 3
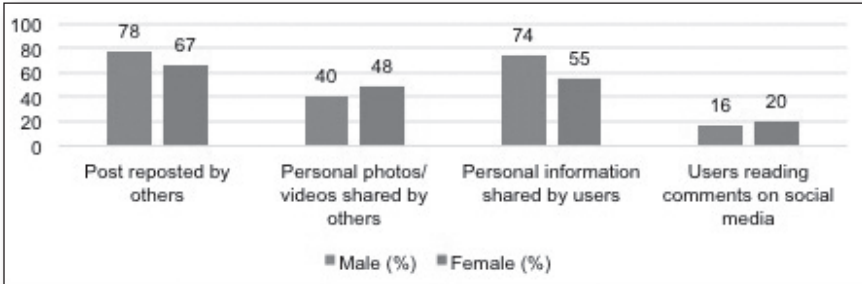**Acceptable self-disclosure on social media in Brunei Darussalem**
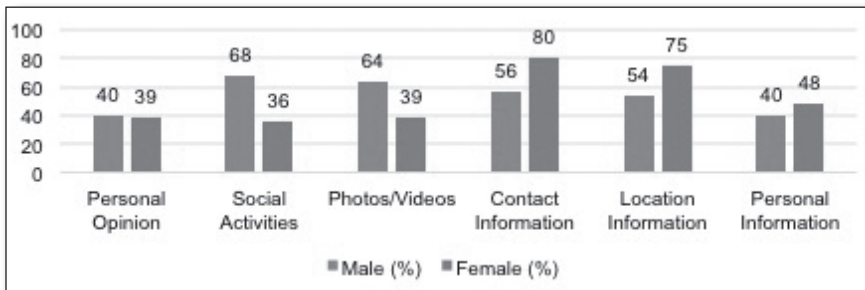
Source: Author's Research Findings

FIGURE 4
Privacy awareness in Brunei Darussalam
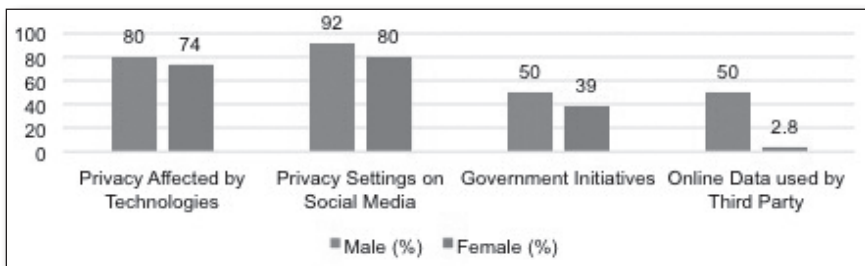
Source: Author's Research Findings

FIGURE 5
Online privacy concerns by gender in Brunei Darussalem

Source: Author's Research Findings

Additionally, gendered privacy concerns are observed among the respondents of the study (Figure 5). In general, those concerns ranked according to the level of concern, include post reposted by others, personal information shared by others, personal photos and videos shared by others, and the least concerned, other users' reading their comments on social media. In terms of proportion, male respondents are more apprehensive of post reposted and the sharing of their personal information while females are more concerns with their photos and videos being shared without permission. This particular concern is also shared by a few of the interview respondents as shown in Box 2.

BOX 2
Interview response on online privacy concerns

"I am concerned with my privacy – I am afraid people will misuse my pictures – Photoshop or edit them without my consent"

"So privacy in Instagram, for me, is by posting late post pictures and not uploading my family pictures"

"Not accepting strangers and not broadcasting everything on social media like people nowadays love to put everything on Instagram, where is their privacy?"

Source: Author's Research Findings

FIGURE 6
What should not be disclosed on social media
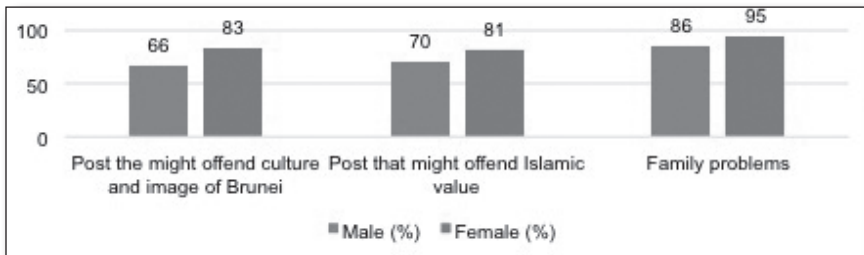
Source: Author's Research Findings

What should not be disclosed is equally important as what is considered as acceptable to disclose on social media. The findings from Figure 6 (Survey) and Box 3 (Interview) show that self-censorship should be applied to post that might offend culture and image of the country, post that might offend Islamic value and family problems. Generally, what cannot be disclosed online amongst this group of respondents can be placed into 2 categories, which are family and personal, driven by societal expectations; and culture and religion. What these suggest is that not only do we observe individual partialities in self-disclosure and privacy concerns but also contextual aspect on both aspects amongst the Bruneians in this study. Knowing this, of course, fitting legislations, framework and related measures must consider Bruneians' socio-cultural, religious and political contexts while also cognizant of and applicable to the general concerns related to online use and the internet.

BOX 3
Interview response on what should not be disclosed

"I think it's something related to things like family issues and, of course, my personal issues as well because it not only affects me as a person and my family but also my surroundings. If something I consider as private is being breached, I know people will look differently on me".

"As a Muslim, I think Muslim's should define privacy in the context of Islam as whatever they post might influence the religion itself - like a girl posting a photo of herself not wearing a hijab. In Islam, it is considered as a sin, so therefore, it breaches their privacy".

Source: Author's Research Findings

RESILIENCE IN THE FACE OF DISRUPTIONS

The fear and worry of Bruneians online presence and online footprint are manifested in a number of events organised by AITI (Authority for Info-Communication Technology Industry of Brunei Darussalam) together with BruCERT such as Poster competition for Cybersecurity Awareness Raising 2015 (Theme: Be Aware, Secure and Vigilant). One of AITI's main focus areas is cybercrimes, which includes infiltration of PCs and mining of confidential data, track business transactions, or host illicit web pages and malicious codes on servers or PCs undetected. This organisation is also responsible for the planning, managing and facilitating the development of a secured national ICT infrastructure. The 3 main areas to be addressed by this organisation are Authentication, Information Security and Cybersecurity[102]. The establishment of this organisation is very much applauded as it is one of the first attempts in the nation to create a comprehensive internet-related development. However, such initiatives are heavily focused on the macro and meso level and have not been focusing on the aforementioned everyday experiences at the micro-scale level. Here is where our perception of an actual privacy concern becomes distorted. We, institutionally, direct our concern on cyber securities and cyber-crimes but we have not been dealing with other more pertinent everyday individual and social privacy issues such as those disclosed by the individual users that may have led to the growing cybercrimes and fraud in the country.

To reiterate, sharing our location on social media using a location-based app, uploading photos of our home, our physical self, our families, and sharing videos/photos of other peoples' activities/actions without their consent, intentional or unintentional expose users to predators eagerly waiting for their opportunities. At present, Brunei already has existing legislation that are thought to be relevant in regulating internet content, for examples, Child Online Protection, National Strategy Framework, Undesirable Publications Act (Cap 25), Public Entertainment Act (Cap 181), Defamation Act (Cap 192), Computer Misuse Order 2000, and Internet Code of Practice[103].

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102 Authority for Info-Communication Technology Industry of Brunei Darussalam (AITI) https://www.aiti.gov.bn (accessed November 20, 2017).

103 Pg. Kasmirhan bin Pg. Hj. Tahir, "Brunei Legal Regime on ICT: Are our laws conducive enough?" Accessed May 1, 2017, http://www. bruneiresources.com/pdf/nasis_s2_6. pdf

However, to the best of the author's knowledge, Brunei does not have comprehensive legislation on online engagement yet, in particular, those addressing privacy in the context of every day new social media engagements at micro-scale level. For example, in recent years, the explosion in the use of WhatsApp in Brunei to disseminate false information has resulted in growing concern over the use of such media platform. There is no legislation written for online self-disclosure, therefore, using Laws of Brunei, Section 34, Public Order Act, Cap 148, 1984, "Dissemination of false report" has been contextually applied. It is written in that section that, "*Any person who, whether orally or in writing or by any other means, spreads false reports or makes false statements likely to cause public alarm or despondency shall be guilty of an offence: Penalty, imprisonment for 3 years and a fine of $3,000*".

This gap in Brunei's available legislation and framework needs to be addressed considering how our society is growing with technologies and new social media use. Drafting measures and framework that fit into the Bruneian context, particularly those that take into account users' self-disclosure practices as presented in this article (individual partialities and, socio-cultural, religious and political contexts), would benefit the country especially considering the growth in our online presence and engagements. There are, however, a number of questions we need to ask ourselves prior to drafting the fitting measures and framework: What do we need to do at the individual, institutional and national levels to be ready for the future of excessive self-disclosure?; Do we need an all in one legislation to protect ourselves?; Should we create contextualised measures and framework, only applicable in the country, when cybercrimes are transboundary in nature?; and finally, how do we deal with transboundary cybersecurity threats?

CONCLUSION

To conclude, as previously mentioned, this article does not aim to offer solutions to cybercrimes. Rather, using the findings of the research on Bruneians' self-disclosure practices on social media, it aims to highlight the nuances in users' social media use and privacy concerns. Such knowledge and the approach used in understanding everyday online activities are significant not only for the academia but for our nations and regions to combat cybercrimes, ensuring online securities and to build resilience in this digital age. We need to go beyond combating cybercrimes at an institutional level to

dealing with the actual understanding of what privacy is in the context of individuals' new social media use and engagements. This research is foreseen as an initial step in the potential drafting of acts and legislation pertaining to online privacy, in the context of the users' self-disclosure, which is urgently needed by the country that sees the growing number of its population online.

Disruptions in Agriculture and Food Security

## Paul Teng

INTRODUCTION: CONCEPTUAL FRAMEWORK

Agriculture plays an important role in Asia's food security. As income levels have improved, hunger has been reduced across the region. While the economic contribution of agriculture has fallen in terms of share of GDP and contributions to job creation, agriculture remains an important role for many countries to assure food security and generate products for export markets. It is also important in averting repeats of famines in the past resulting from combinations of natural hazards (droughts, floods) and state policies, and in preventing food-related causes of conflict and political instability. Apart from this, agriculture plays an important part in the region's cultural heritage, although the declining share of the labour force in agriculture raises questions on whether this can be sustained.

Agriculture and food security are inextricably linked as agriculture currently is the main source of food. The FAO, UN considers Food Security to be a "situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life"[104]. This has been variously decomposed into several dimensions (Figure 1) , with the attainment of food security occurring only when the following four basic dimensions are satisfied simultaneously: "availability", "physical access", "economic access" and "utilisation"[105]. A fifth dimension, "stability", emphasises the importance of the stability of the four dimensions over time. While each dimension is necessary for overall food security, they likely have different weightings in rural and urban settings and also across economies with different incomes and net food trade balances.

104 UN FAO; IFAD; World Food Programme (WFP). *The State of Food Insecurity in the World 2015–Glossary of selected terms*. UN FAO, 2015. http://www.fao.org/hunger/glossary/en/. Accessed 2 September 2017

105 Teng, P.S. and J.A.P. Oliveros. "Challenges and Responses to Asian Food Security". *COSMOS* 11 (1) (2015): 1–18. DOI: 10.1142/S0219607715500019.

FIGURE 1
Schematic of food security dimensions and main components
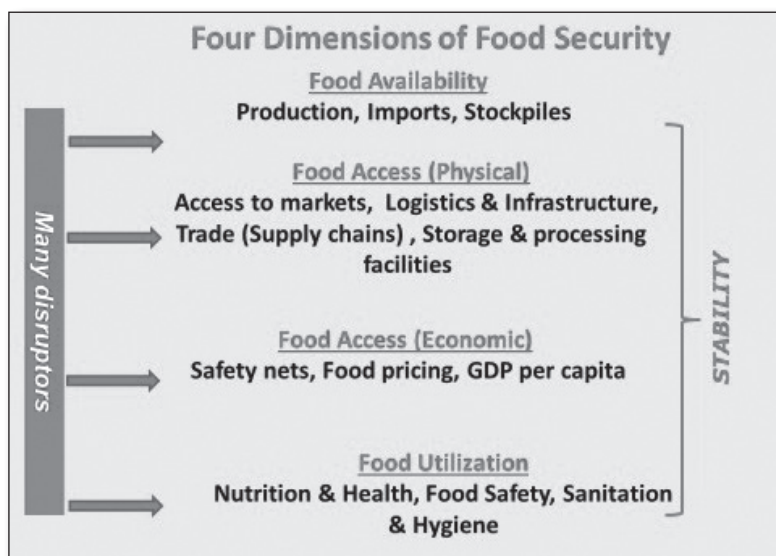
The **Food Availability** dimension has historically been the most recognised aspect of food security, with much effort devoted to growing enough food. Food is commonly available to households in a country through multiple sources – self-production (through agriculture and aquaculture), imports (through regional and global trade), food reserves and stocks, contract farming, and food aid.[106] These sources have been analogised as "food taps" to describe the fact that any one of these sources potentially could be disrupted or turned off completely.[107]

Asian countries range from those that are heavily dependent on imports (e.g. Singapore, Hong Kong, Brunei) to those with significant self-production of many food items (e.g. China, Indonesia), although not necessarily being self-sufficient in all of them. Countries have varying policies to ensure food availability, from declared self-sufficiency, such as for rice (Indonesia, Philippines) to self-reliance (i.e. having the ability to purchase food through

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106   Teng P.S., Escaler M. "Food Security in Asia". In Hofmeister W, Rueppel P, Wong J (eds.), *Food Security: The Role of Asia and Europe in Production, Trade and Regionalism*. Kondrad Adenauer Stiftung and European Union pp. 11–36, 2014.

107   Teng P.S. „Food Security: What it means for a food-importing country". *RSIS Commentaries*, RSIS Singapore. (2013).

imports, e.g. Singapore). The latter also has seen countries like Singapore articulate a strategy called "food resilience", which means to ensure that any food item has several sources to import from, so that should supply from one source-country be disrupted, there is potential replacement from others.[108]

Agriculture directly feeds into the first dimension of food availability, although food may be made available through other means, such as imports via trade, stockpiles, overseas contracted farming and for some countries, food aid.

▸ **Physical access to food** encompasses all aspects of moving food from "farm to consumer" and is generally taken to mean the food supply chain, logistics and transport infrastructure. Asian countries differ greatly in this dimension of food security, from the archipelagic countries with a relatively poor capacity to address this (e.g. Indonesia, Philippines) to those with strong capacity (e.g. Korea, Thailand, Japan, Malaysia)[109]. Associated with this dimension is also another significant issue – that of losses in perishables like fresh vegetables, fruits and fish which in the developing countries of Asia can reach up to 40%.

▸ **Economic access to food** is strongly linked to per capita income levels. It is well substantiated that the poorer sectors of society spend a disproportionately higher per cent of their income on food than the more affluent.[110] This has an added influence on household nutrition as in low income developing countries, households may spend as much as half their income on food alone. Countries differ in the type of government-sponsored safety nets for the food insecure, with innovative ones like the special government grocery shops in Malaysia, which sell only to those families below a certain income level and at prices below retail. The price of rice is subsidised by almost all the

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108 Teng, P.S. and J.A.P. Oliveros. "Challenges and Responses to Asian Food Security". *COSMOS* 11 (1) (2015): 1–18. DOI: 10.1142/S0219607715500019.

109 Ibid

110 Teng P.S., Escaler M. "Food Security in Asia". In Hofmeister W, Rueppel P, Wong J (eds.), *Food Security: The Role of Asia and Europe in Production, Trade and Regionalism*. Kondrad Adenauer Stiftung and European Union pp. 11–36, 2014.

governments of rice-eating countries. The private sector and civil society (in the form of non-governmental organisations and voluntary welfare organisations) offer food kitchens and free groceries to the poor in higher income and middle-income Asian countries like Singapore and Japan[111].

▸ **Food utilisation** is of concern from nutritional and food safety aspects. The annual "State of Food Insecurity" (or "SOFI") Report by the Food and Agriculture Organisation, United Nations, regularly estimates > 500 Million hungry in Asia while the World Food Program maps millions of malnourished and under-nourished in many countries. Food safety standards vary greatly between Asian countries and in some have become the symbol of food insecurity due to food scares emanating from contamination.

Using this framework of four dimensions plus stability, it is possible to consider disruptions as negatively affecting each dimension in the near term (Figure 2) and mid to long-term (Figure 3).

NEAR TERM DIRECT NEGATIVE DISRUPTIONS

Direct negative disruptions are those known to affect each dimension under current circumstances. Food availability is the dimension most vulnerable to disruptions and is also the dimension in which the farmer-producer takes the most risk of loss from a host of factors shown in the figure (Figure 2) — unexpected severe weather, natural calamities, pest and disease outbreaks, input (fertilisers, pesticides, seed) shortages, and human pandemics which reduce the availability of labour needed for farming and post-farm processing of agricultural products.

Access to food, whether physical or economic, may be disrupted by a host of factors which include rising energy prices (which disrupt supply of inputs and increased cost of moving farm produce), sudden policy changes which disrupt trade (exports and imports) including non-tariff measures, lower holdings of cereal stocks (which result from hoarding or may cause a vicious cycle of spurred food purchase), diversion from staple to cash crops

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111 Ibid

FIGURE 2
Schematic of near term direct negative food security disruptors
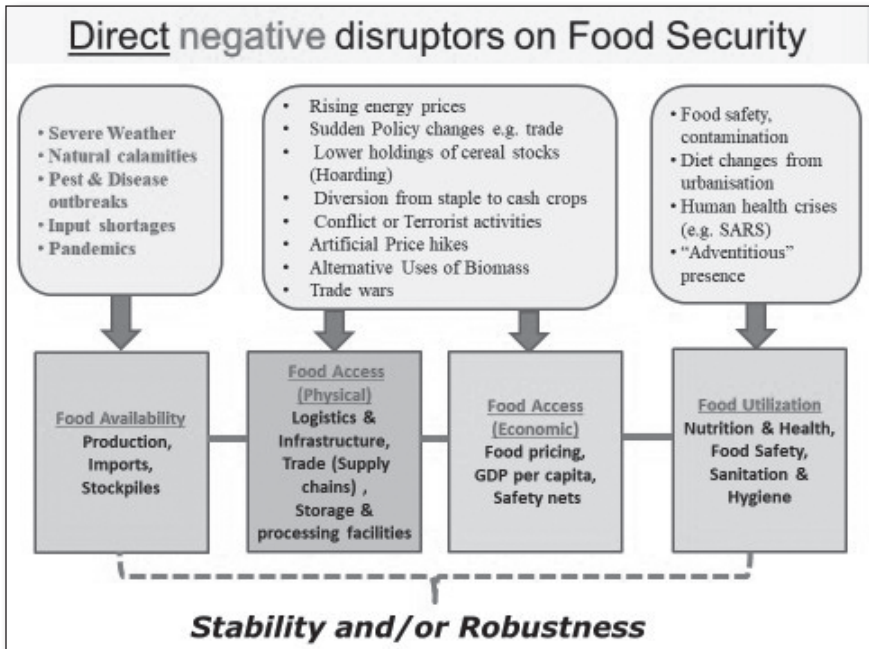
(as when happens when there is a seasonal demand for cash crops like fruits for special cultural events), conflict or terrorist activities which disrupt the supply chain especially transboundary shipments of food, artificial price hikes caused by sudden supply shortages which makes food unaffordable to low economic groups, alternative uses of food crop biomass such as for energy production (as raw material for ethanol or diesel production), and outright trade wars which stop food trade.

Food utilisation may be directly affected by food safety scares caused by contamination with chemicals or biological agents, diet changes from urbanisation which have led to increased consumption of processed food and a consequential effect on the incidence of non-communicable diseases such as diabetes and obesity, human health crises (e.g. SARS) which reduce food consumption, "adventitious" presence of unapproved food ingredients such as unapproved genetically modified events in crops.

MID TO LONG TERM NEGATIVE DISRUPTIONS

Over a longer time horizon, many factors have potential to disrupt all dimensions of food security --climate change (especially elevated ambient and sea temperatures, rainfall pattern changes, sea level rise), demographic changes (increasing urbanisation with a concomitant declining number of farmers), chronic poverty (partly caused by the increasing gap between "haves" and "have-nots" in many countries), underinvestment in infrastructure/technology which caused countries to underperform in food production and processing, degradation of land and water resources for agriculture (for example, an estimated 3% of arable farmland is lost per year in Asia), unfriendly policies towards farmers (which keep farm produce prices low in order to keep food prices low for urban consumers, inability to attract new players into agri-food systems with strong livelihood and economic incentives (resulting in fewer farmers), and an increasing incidence of food fraud (in which food labels do not depict what the actual food content is).

Many of these longer-term disruptors are being studied all over the world. Food availability through agriculture as affected by climate change,

FIGURE 3
Schematic of mid to long term negative food security disruptors
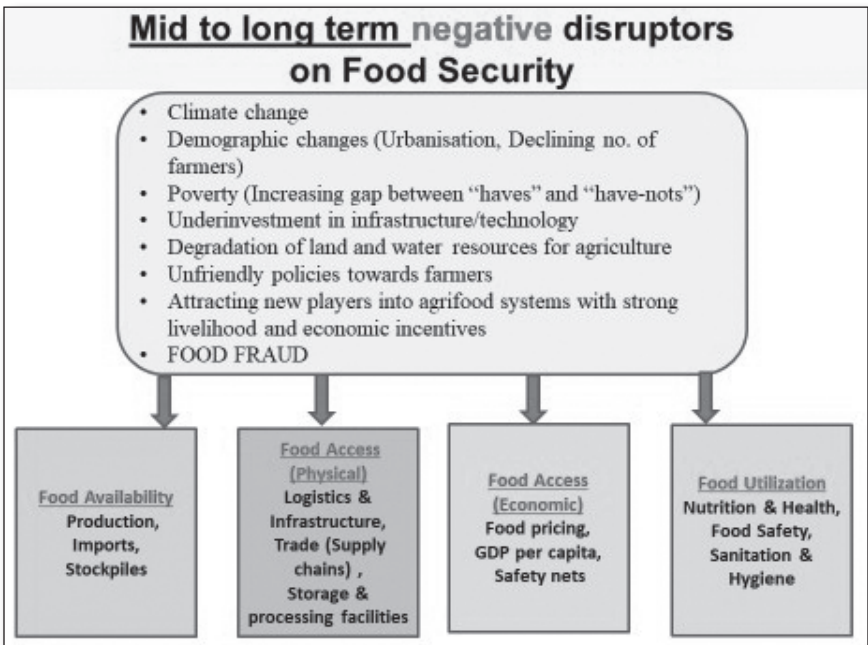
for example, is the subject of intensive studies by many groups with findings so far suggesting the need to start taking adaptation measures.

One or more of these disruptors have the potential to reduce the robustness of food security in a country and destabilise the "farm to consumer" supply chain. Hence food security robustness as a concept advocates that governments determine how to deal with disturbances to their food systems.

FOOD SECURITY ROBUSTNESS

The stability dimension of food security may be represented through a rubric such as "robustness" [112] which encapsulates the capacity to maintain stability. "Food security robustness", is broadly defined, as "*a country's ability to withstand any perturbations to its food security system by having a balanced capacity to make food available; ensure that production is sustainable; and provide the necessary infrastructure and policies to support domestic production, promote trade and manage food demand and affordability.*" The concept is embedded in a food security index called the "Rice Bowl Index (RBI)" © developed by Syngenta company and Frontier Strategy Group in collaboration with Nanyang Technological University Singapore.

The RBI uses indicators grouped into four rubrics – Farm level factors, Demand and Price factors, Policy and trade factors, and Environmental factors. Using this index, countries like Australia, New Zealand and Japan show high "robustness" because of their balance of the four sets of rubrics, whereas a country like Singapore, with almost no means of self-production, scores lowly on "robustness" and is therefore very vulnerable to any disruptions on the supply of food from the region or globally.

Having high robustness means that a country is resilient and can cope with many disruptors. In the short term, resilience is achieved by countries like Singapore by having a diverse pool of sources from which it imports food, with the diversity being both geographic and seasonal. As of 2016, Singapore imported 90% of its food needs from over 160 countries worldwide[113].

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112 Teng, P. and M.C.S. Morales. "A new paradigm for food security: robustness as an end goal". *RSIS NTS Policy Brief PO 13-05*. (2013). 6 pp.
113 AVA (2017), AVA Annual Report 2016/17, accessed 15 November 2017, https://www.ava.gov.sg/docs/default-source/publication/annual-report/ava-ar-2016-17.

POSITIVE DISRUPTIONS (DISRUPTIVE INNOVATIONS)

Not all distortions are negative and the term "disruptive innovation" has been used to describe those factors (innovations) which have dramatically changed one of the dimensions. For example, in agriculture, crop yields were significantly increased through the first Green Revolution technology of improved seed using modern plant breeding techniques. Indeed, the role of technological innovations as positive disruptors may be chronologically grouped into the following:

▸ First wave of innovations in the 1960s: Green Revolution technologies of improved seed, fertiliser, pesticides, irrigation and mechanisation;

▸ Second wave started in 1996: Biotechnology crops planted in farmers' fields;

▸ Third wave started in late the 1990s and early 2000s for different tools: Digital – Biological integrated technologies such as those collectively called "Agtech", which includes Knowledge Intensive Agriculture (KIA) tools as part of the digital revolution in agriculture that in turn is capitalizing on the 4th Industrial Revolution, and the Biotechnology Revolution. New financing platforms, "Fintech", are also helping expedite the discovery/invention to adoption pathway; and

▸ Fourth wave which actively started in the 2010s: Food without agriculture, including synthetic biology applications.

Historically, farming has seen many disruptive innovations, such as hybrid corn in the 1920s, biotech crops in 1996, and now digital agricultural technologies and genome edited crops and animals in the 2010s. Currently, much is happening in agriculture to tap into the digital revolution as well as the emergence of new biotechnology tools collectively called "New Breeding Technologies" which allow precision breeding for important crop traits such as those to tolerate climate change. Agtech progress has resulted in individual technologies or a combination of technologies related to farm equipment, weather, seed optimisation, fertiliser and crop inputs, irrigation, remote sensing (including drones), farm management, and agricultural big data.

Apart from the above, the new impetus for KIA means that farmers, especially smallholder farmers in Asia, have access to myriad tools to practice "data enabled agriculture" – environment sensors, mobile computing, satellites and imaging, drones, wireless communication and even genetics. The growth of knowledge in digital form, AND the increasing capacity of

small farmers to access digital information provide opportunities not possible before to share timely information on farming environments and the required management knowledge. With knowledge, physical inputs and technology, KIA democratise the sharing of knowledge. It also has the added attraction of luring millennials and other new entrants into agriculture at a time when almost all countries are faced with the twin problems of an ageing and declining farming population[114].

Finally, in coping with disruptions, a level of resilience is possible by anticipating scenarios which give rise to disruptions, and by anticipating such scenarios. Potential disruption scenarios include the following –

▸ A Global Health Pandemic,

▸ Disruption of Food Supply Chains (logistics, infrastructure),

▸ Intentional Food Contamination,

▸ Unintentional Food Contamination – Biosecurity lapses, Food Safety or Trade Issues,

▸ Disruption of Domestic Food Distribution systems,

▸ Interruption of Global Input Supply (including NTBs),

▸ Contamination of Key Food Items at Source,

▸ Production Supply Shortage due to unexpected events,

▸ Price Increase of Key Food Items,

▸ Panic Buying,

▸ Increased imports from competing countries, and

▸ Cyber security lapses (intentional, accidental)

Ultimately, because agriculture is likely to remain the main source of food to assure food security at all levels, it behoves governments to have in place the capacity to monitor any changes in the negative disruptors shown in Figures 2 and 3. The outlook though is on the balance a positive one, as experience has shown that societies respond by generating positive disruptive technologies with overwhelming outcomes.

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114 Paul Teng. "Knowledge Intensive Agriculture: The New Disruptor in World Food?" *RSIS Commentary* No. 124 – 23 June 2017.

Sobering Realities in Investment in International Science for Food and Nutrition Security

V. Bruce J. Tolentino

International agricultural research is generally recognised as meeting the definition of a "global public good" (GPG), i.e. "… institutions, mechanisms, and outcomes that provide quasi-universal benefits, covering multiple countries, population groups, and extending from current to future generations (Kaul, Grundberg, and Stern, 1999).

The producers of international agricultural research most often identified are the international agricultural research centres (IARCs) – particularly the 15 centres loosely organised under the CGIAR[115]. Additionally, there are the 9 research institutes organised under the Association of International Research and Development Centres for Agriculture (AIRCA).

THE IARCS: A BRIEF HISTORY

The first international agricultural research centres to be organised were founded through the joint efforts of the Rockefeller and Ford Foundation – both American philanthropies. The International Rice Research Institute (IRRI) was established in Los Banos, the Philippines, in 1960. The success of the "green revolution" in rice and wheat enabled the green revolution was produced in the laboratories and experimental fields of IRRI and CIMMYT and inspired the establishment of the international agricultural research centres listed in Table 1.

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115 "CGIAR" formerly was an acronym – Consultative Group for International Agricultural Research. Following reforms enacted between 2012–2014, "CGIAR" now refers to "a global partnership (of international agricultural research centres) that unites organisations engaged in research for a food secure future."

CGIAR centres

CGIAR Center	Year Founded	HQ Location	Mandate Commodities/ Research Focus/ Regions
IRRI (International Rice Research Institute)	1960	Los Banos, Philippines	Rice
CIMMYT (International Maize and Wheat Improvement Center)	1966	Mexico City, Mexico	Maize, wheat
CIAT (International Center for Tropical Agriculture)	1967	Cali, Colombia	Beans, cassava
IITA (International Institute of Tropical Agriculture)	1967	Ibadan, Nigeria	Cassava, maize, cowpeas, yams, soybeans, bananas, and plantains in Africa
Africa Rice Center	1971	Abidjan, Cote d"Ivoire	Rice in sub-Saharan Africa
CIP (International Potato Center)	1971	Lima, Peru	Potatoes, sweet potatoes, other root crops
ICRISAT (International Crops Research Institute for Semi-Arid Tropics)	1972	Pantacheru, India	Sorghum, millets, pigeonpeas, chickpeas, groundnuts
Bioversity	1974	Rome, Italy	Plant genetic resources
Worldfish Center (formerly ICLARM – International Center for Living Aquatic Resources Management)	1975	Penang, Malaysia	Aquatic resources management
IFPRI (International Food Policy Research Institute)	1975	Washington DC, USA	Food policy
ICARDA (International Center for Agricultural Research in Dry Areas)	1977	Aleppo, Syria	Barley, lentils, fava beans, wheat, chickpeas in Middle East and North Africa
ICRAF (World Agroforestry Center/ International Center for Research on Agroforestry)	1978	Nairobi, Kenya	Agroforestry
IWMI (International Water Management Institute)	1985	Colombo, Sri Lanka	Irrigation and water management
CIFOR (Center for International Forestry Research)	1993	Bogor, Indonesia	Sustainable forestry management
ILRI (International Livestock Research Institute)	1994	Nairobi, Kenya	Livestock, esp. in Africa

TABLE 1
**Members of the Association of International Research and Development
Centers for Agriculture (AIRCA)**

AIRCA Center	Year Founded	HQ Location	Mandate
icipe (International Center of Insect Physiology and Ecology/ African Insect Science for Food and Health)	1970	Nairobi, Kenya	" … developing and extending management tools and strategies for harmful and useful arthropods, while preserving the natural resource base…"
WorldVeg (World Vegetable Center – formerly AVRDC: Asian Vegetable Research and Development Center)	1971	Shanhua, Taiwan	Vegetables
CATIE (Tropical Agricultural Research and Higher Education Center)	1973	Cartago, Costa Rica	Sustainable agriculture-based livelihoods, particularly across tropical America/ Mesoamerica
IFDC (International Fertilizer Development Center)	1974	Muscle Shoals, Alabama, USA	"… development and transfer of effective and environmentally sound crop nutrient technology and agribusiness expertise."
ICIMOD (International Center for Integrated Mountain Development)	1984	Kathmandu, Nepal	To assist mountain people in the Hindu Kush Himalaya to adapt to globalization, climate change, and other influences on fragile mountain ecosystems and livelihoods
CABI (Center for Agriculture and Biosciences International)	1987	Wallingford, UK	"provide information and scientific expertise to solve problems in agriculture and the environment"
INBAR (International Network on Bamboo and Rattan)	1997	Beijing, China	"… environmentally sustainable development using bamboo and rattan."
ICBA (International Center for Biosaline Agriculture)	1999	Dubai, UAE	Delivering solutions for sustainable agriculture under marginal conditions
CFF (Crops for the Future)	2011	Kuala Lumpur, Malaysia	Underutilized crops

FUNDING FOR INTERNATIONAL AGRICULTURAL RESEARCH

A recent effort to appraise the value and purposes of investments in global public goods arrived at an estimate of roughly US$14 Billion in 2012, slightly more than 10% of total official development assistance (ODA) for the year (Birdsall and Diofasi, 2015). The appraisal included US$505 Million (or 4% of the total) for the CGIAR Fund as a "development oriented Global Public Goods Facility" (Birdsall and Leo, 2011).

In the main, the financing for the work of IARCs through the last 60 years have mostly come from the official development assistance (ODA) allocations contributed by the member-countries of the Organisation for Economic Cooperation and Development (OECD) (Figure 1). Such funding grew from US$20M in 1972 – the year when the CGIAR was founded, to a peak just over US$1.0B in 2014, to US$889.4 in 2016 – the latest figure available.[116]

FIGURE 1
Total funding for the CGIAR, 1972–2016 (IS$m)
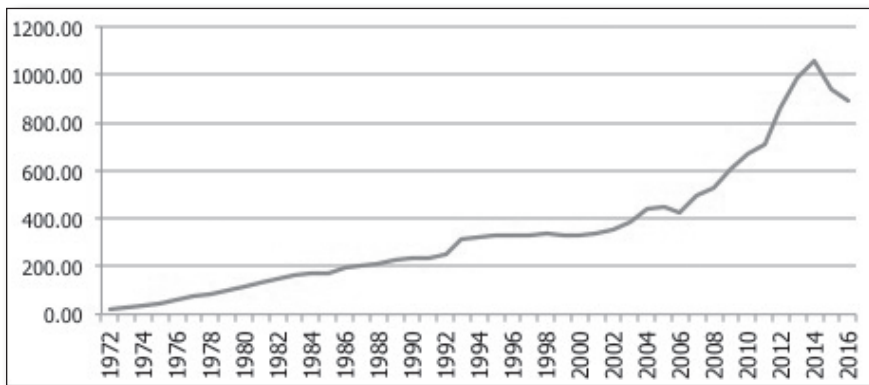
In 1980, total contributions to CGIAR grew to US$119.6M. Industrialised countries were the dominant contributors providing US$84M or over 70% of total funding, while the private donors gave only US$3.4M. The top 10 contributors in 1980 were: the USA ($29M), the World Bank (US$12M), Germany (US$10.1M), Japan (US$7.0M), Canada (US$6.9M), the UK (US$6.8M), the Islamic Development Bank (US$6.7M), UNDP (US$4.6M),

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116   Data culled from various Financial Reports of the CGIAR.

the European Union (US$4.5), and the International Fund for Agriculture Development (US$3.6M).

In 2016, the most recent financial report of the CGIAR shows that the system received a total of US$538.4M for the year, with the US government contributing 40%. The second largest contributor was the Bill and Melinda Gates Foundation, contributing US$95.8M. Together, the American entities – public plus private – contributed 58% of the total CGIAR revenue in 2016.

TABLE 2
**Top 10 donors to the CGIAR in 1972, 1980, 1990, 2000, 2010, and 2016 (in US$ million)**

Donor	1972	1980	1990	2000	2010	2016
USA	3.8	29.0	45.1	42.1	86.3	217.0
B&M Gates Foundation					71.4	95.8
UK	0.7	6.8		14.9	49.1	43.2
Netherlands			6.4	13.7		33.8
World Bank	1.3	12.0	34.3	45.0	50.0	30.0
African Dev"t Bank						21.6
Mexico						18.1
Switzerland			11.6	18.3	22.0	17.2
IFAD		3.6				15.8
Australia					22.1	15.4
Ford Foundation	5.3					
Rockefeller Foundation	4.0					
Canada	1.2	6.9	15.4	11.4	40.2	
Sweden	1.0		9.4	9.4		
UNDP	0.9	4.6				
Norway	0.8				22.0	
Kriege Foundation	0.8					
European Union		4.5	15.4	22.3	42.7	
Germany		10.0	11.2	10.2	21.4	
Japan		7.0	23.2	34.6		
Islamic Devt Bank		6.7	10.5			
TOTAL Contributions by ALL Donors	20.7	119.6	234.9	331.0	673.0	538.4

It should be noted that the monies provided by the IFIs continue to largely be grants. However, the contribution of the World Bank has decreased to US$30M from a high of US$50M in 2010, with WB management stating that WB support to the CGIAR will continue with funding modality shifting from direct grant to CGIAR or CGIAR centres, to project-based funding for technical assistance, with significant erosion of grant elements.

## OFFICIAL FLOWS FOR AGRICULTURE AND RURAL DEVELOPMENT

What is most interesting in the OECD data is that while total ODA has been rising almost continuously over the past decades, Global real ODA devoted to RDA broadly, and agriculture more specifically, has fallen - particularly in the recent decade – from US$20 Billion in the early 1980s to less than US$5 billion in the mid-2000s.[117]

FIGURE 3
**Official development aid to agriculture and rural development, 1973–2013
(5-year moving average of commitments, constant 2013 prices)**

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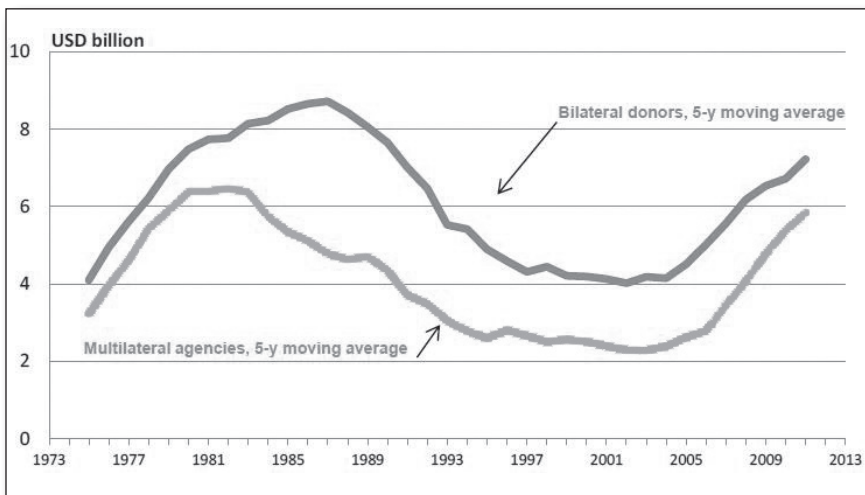
117 OXFAM International, "Investing in Poor Farmers Pays: Rethinking How to Invest in Agriculture". Briefing Paper 129, OXFAM, June 2009.

FIGURE 4
Global real ODA to agriculture (oxfam briefing paper 129)
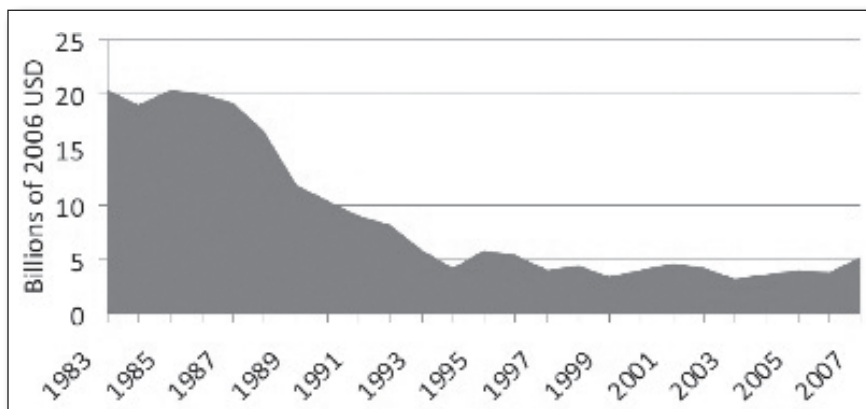
Moreover, the share of agriculture of total ODA has also fallen from a high of close to 8–9% in the 1980s to less than 4–5% since the 1990s. ODA to agriculture experienced a brief resurgence in the wake of the global food price crisis in 2007–2008. There was a flurry of international pledging sessions for increased assistance for food security, highlighted by the creation of the Global Agriculture and Food Security Program (GAFSP) at the G-20 meeting in September 2009.

Since then, in the years following the food price crisis, it has become much clearer that the food price crisis of 2007–2008 was largely a market reaction to the global financial crisis. Thus, political and donor concern for agriculture and food security settled into the fairly complacent state induced by the success of the green revolution, and ODA for agriculture has again been falling since 2013–2014.

Of more interest is ODA for agricultural research, especially basic science. The OECD data on ODA is highly aggregated and, thus, masks variations in ODA flows to sectors and any number of subsectors, including agricultural research.

For example, in Table 3 below, "ODA to RDA" is an aggregation of 32 subcategories of ODA, including: *agricultural policy and administrative management, agricultural development, agricultural land resources, agricultural water resources, … food crops, industrial crops, livestock, … agricultural*

TABLE 3
**Official development assistance to rural development and agriculture sectors,
2008–2016, constant 2015 US$ million, OECD creditor reporting system**

Sectors	2008	2009	2010	2011	2012	2013	2014	2015	2016
Agricultural policy and management	1,135	2,097	1,526	1,440	1,448	1,182	843	1,878	2,059
Agricultural development	846	1,639	1,935	2,545	2,064	2,310	2,554	2,627	2,944
Agricultural land resources	173	317	116	212	503	261	192	352	592
Agricultural water resources	1,190	856	1,074	1,184	1,509	1,539	2,089	1,725	735
Agricultural inputs	408	133	122	128	189	133	100	186	66
Food crop production	441	395	255	294	460	691	528	523	205
Industrial crops/export crops	225	128	311	192	264	172	76	143	76
Livestock	51	126	110	79	419	127	305	353	231
Agrarian reform	24	29	26	38	19	78	11	6	20
Agricultural alternative development	428	327	278	251	180	184	142	171	103
Agricultural extension	85	76	104	192	128	61	159	258	120
Agricultural education/training	84	80	68	108	101	151	87	111	113
Agricultural research	740	430	671	567	417	697	384	409	546
Agricultural services	174	243	188	81	226	178	125	345	121
Plant and post-harvest protection	33	23	17	15	52	50	28	21	37
Agricultural financial services	173	216	140	157	477	396	243	133	476
Agricultural co-operatives	66	156	60	52	219	81	150	112	79
Livestock/veterinary services	60	136	99	44	55	32	172	42	83
Forestry policy and management	238	202	318	446	426	357	311	324	472
Forestry development	282	191	126	456	217	153	476	410	160
Fuelwood/charcoal	1	7	55	3	71	30	8	3	0
Forestry education/training	17	3	6	5	11	3	4	2	4
Forestry research	13	7	16	26	9	20	10	8	3
Forestry services	1	6	3	6	7	13	1	1	1
Fishing policy and management	136	135	117	132	98	223	119	150	127
Fishery development	190	203	176	134	104	134	101	110	290
Fishery education/training	11	5	17	15	14	7	4	13	4
Fishery research	11	18	20	42	8	8	2	6	1
Fishery services	80	138	31	9	17	26	81	40	28
Rural development	1,385	1,444	2,582	1,443	1,387	2,644	1,168	2,041	1,142
Food aid/Food security programmes	1,645	1,982	1,450	1,272	1,416	1,179	1,135	1,466	2,024
Emergency food aid	3,799	3,264	2,908	2,880	2,665	3,395	3,147	3,206	4,379

research, … forestry, … fishery, … rural development, … emergency food aid. In fact, the aggregation of the donor-reported numbers is such that many sectors other than "agricultural research" probably include funding for agricultural research but is not reported as such.

Moreover, it is quite possible that donors simply identify grants to CGIAR centres as agricultural research, while allocating grants to non-CGIAR centres to non-agricultural research categories.

The data on ODA for "agricultural research" is not further disaggregated. Between 2008 and 2016, the peak absolute amount allocated to agricultural research was US$740 million in 2008 – the year of the food price crisis.

However, the US$740 million for agricultural research in 2008 represented only about 0.5% of total ODA for the year (Figure 5), and about 11.5% of the amount allocated to agriculture as a whole (Figure 6).
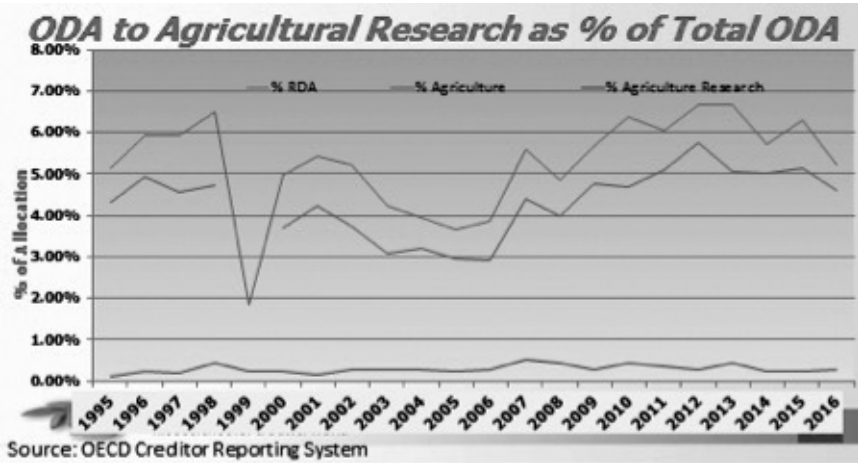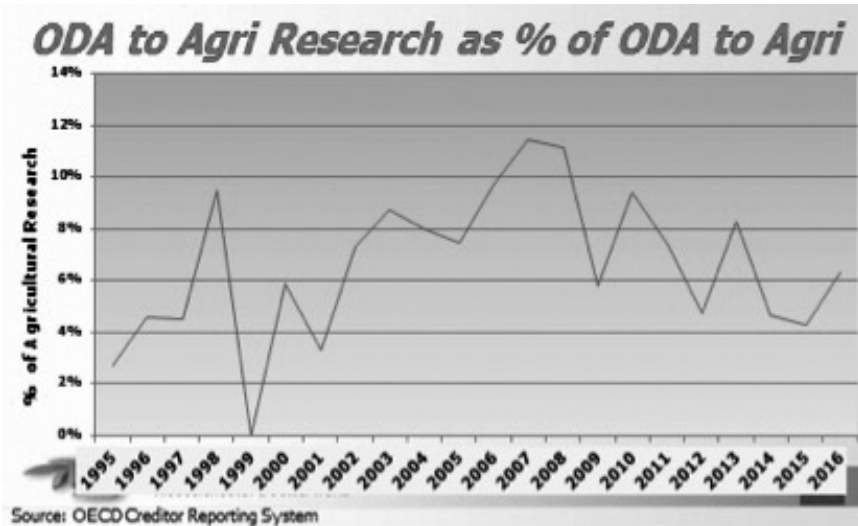
FIGURE 5

Source: OECD Creditor Reporting System

FIGURE 6

ODA to Agri Research as % of ODA to Agri

Source: OECD Creditor Reporting System

What the exposition above demonstrates is that historically, funding for agriculture, particularly agricultural research conducted by the international agricultural research centres (including the CGIAR and AIARC) – has been provided by Western and highly developed governments.

THE EXPERIENCE OF IRRI

The experience above across the international agricultural research centres comes into sharp relief when the experience of a single CGIAR centre is reviewed. The International Rice Research Institute (IRRI) was the very first international agricultural research centre to be organised, in 1960.

ODA for agriculture generally and for IRRI specifically fell in the 1990s as the development community slipped into complacency about food security and continuing agricultural growth. The world community was jolted by the intertwined food price and financial crises of 2007–2009 – resulting in a jump in funding. However, since 2014, ODA for IRRI has again begun to slide.

FIGURE 7
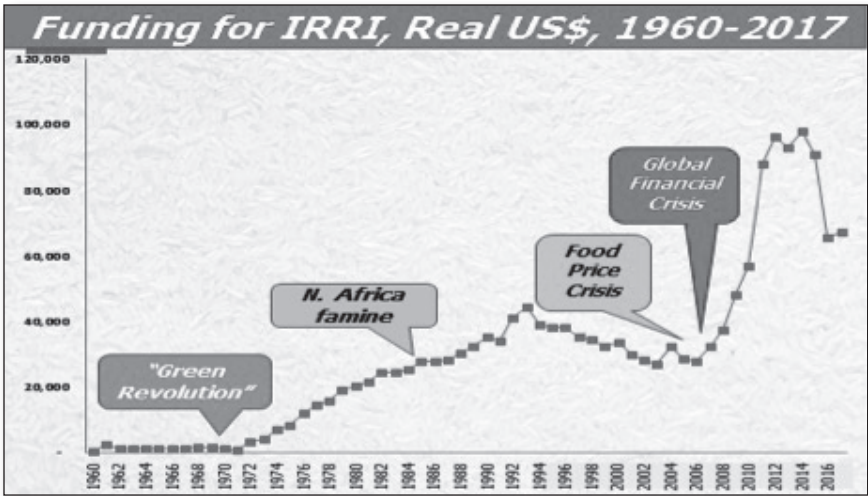
From its founding till the early 1970s the key funder of IRRI were the Ford and Rockefeller Foundations, and since 1970, the US government.

FIGURE 8
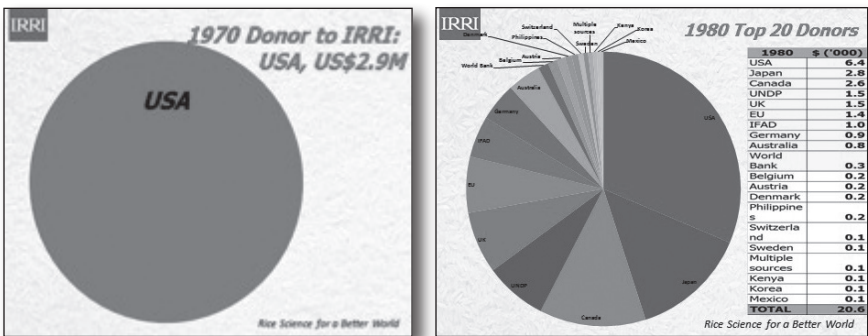
In 1980, the top 10 donors to IRRI were: the USA, Japan, Canada, the UNDP, the UK, EU, IFAD, Germany, Australia, and the World Bank. In was only in 2010, that a heretofore "developing country" – China, begun to be listed as a "top 10" donor. In 2016, the Philippines and India are among the "top 10" donors to IRRI.

FIGURE 9
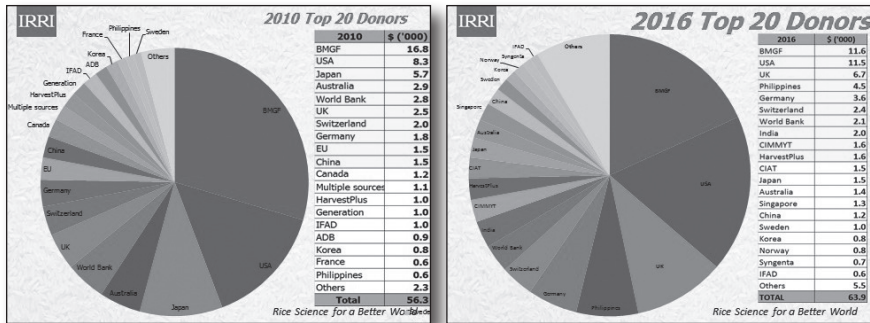
Particularly in the case of rice and IRRI, historically, the financing of scientific research has come from Western and more developed countries most of whom do not grow rice nor consume rice as a staple. The principal beneficiaries of rice research have been the economies and peoples of rice-growing countries.

BREXIT, THE GLOBAL FINANCIAL CRISIS, AND DONALD TRUMP

It is increasingly evident that Western and more developed countries will increasingly shy away from continuing to fund international public goods, including international agriculture. The global financial crisis of 2008–2010, hit the advanced economies hard and caused them to reduce their international ODA commitments.

Increased political concern on refugees has become the dominant aid issue in Europe, heightened by Brexit. More recently, the entry of Donald Trump and his administration's gutting of US international aid has significantly reduced international funding for global public goods.

RECENT DEVELOPMENTS AMONG ODA RECIPIENT COUNTRIES IN ASIA

Ninety per cent of the global rice supply is produced in Asia. Many Asian economies, particularly China and the other Asian "tigers", most of the

ASEAN-10, and India have experienced remarkable economic growth over the last three decades. Following the "Green Revolution" of the 1970s and 1980s, the "Asian Miracle" transformed the Asian economies – particularly those in North and Southeast Asia through the 1990s. China, Vietnam, Malaysia, and then India, boomed through the 2000s. In more recent years the Philippines has grown rapidly.

In recent decades many countries have "graduated" from the status of aid recipients to independently-financed economies. Many countries have moved beyond the status of "least developed countries" that qualify them as eligible for concessional loans and grants.

Some of the fast-growing Asian economies – particularly Korea, China, and India - have emerged as new global donors. South Korea assumed formal donor status toward the close of the 20th century as it established its own development aid agency – the Korea International Cooperation Agency (KOICA) in 1991. In 1996 Korea became a member of the OECD and became a member of the OECD's Development Assistance Committee (OECD-DAC) in 2010.

FROM AID RECIPIENTS TO INDEPENDENT ECONOMIES

As many of the Asian economies have "graduated" into middle-income status, they have also gained fiscal resources that may be invested in public goods, presumably including research and development (R&D). A recent meta-analysis of public investments in R&D concludes significant, positive benefits in innovations as well as the spread of innovations. In general, the studies conclude that a 10% increase in public R&D, measured as a ratio of R&D expenditures to GDP, results in an increase of about 1.7% in Total Factor Productivity, which spurs economic growth. Moreover, the economic returns to public R&D are around 20%. Finally, public funding of R&D positively leverages private/ business investment in R&D.[118]

Yet such investment in R&D has not taken place among many of the Asian economies at levels adequate enough to generate useful results. Data on investments in R&D of Asian economies is rather sparse – and is not

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118 European Commission, "The Economic Rationale for Public R&I Funding and Its Impact", Policy Brief Series, EU March 2017

disaggregated by sector. Data from the World Bank Indicators report that South Korea invests the largest proportion of its GDP in R&D at 4.2% in 2015, followed by Japan at 3.5%. Indonesia, the Philippines, Thailand, and Vietnam – major rice-growing and consuming countries – each invest well below 1% in R&D. These levels are quite low in relation to a "rule of thumb" investment level of a minimum of 1–2% of GDP.[119]

TABLE 4

Public Expenditure on R&D as % of GDP					
Country	2011	2012	2013	2014	2015
China	1.78	1.91	1.99	2.02	2.07
India	0.82	..	..	..	..
Indonesia	..	..	0.09	0.09	0.09
Japan	3.38	3.34	3.47	3.47	3.47
Korea, Rep.	3.75	4.02	4.15	4.28	4.23
Malaysia	1.06	1.13	..	1.30	1.30
Philippines	0.12	..	0.14	..	..
Singapore	2.15	2.01	2.01	2.20	..
Thailand	0.39	..	0.44	0.49	0.06
United States	2.77	2.70	2.74	2.76	2.79
Vietnam	0.19	..	0.37	..	..

Source: World Bank Indicators

ENCOURAGING AND ENABLING BENEFICIARY ECONOMIES TO INVEST IN INTERNATIONAL AGRICULTURAL RESEARCH

With little doubt, the traditional sources of funding for international agricultural research are drying out, or becoming much smaller and much more motivated by returns of such research to the donor countries, rather than to the world as a whole. The countries that have benefited from the international R&D the most – and as a result have grown – need to invest their own resources in R&D for their own benefit.

However there is limited appreciation among the beneficiary countries on the economics of public investment in R&D (whether domestic or international), as demonstrated by the relatively low levels of such investment across many Asian economies outside of Japan, Korea, Singapore and more recently, China.

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119 No reference could be found for this "rule of thumb"/benchmark on investment in R&D.

A further constraint to funding by beneficiary economies for international public goods is that there is little or no experience nor structures in their domestic public finance systems to allocate and handle funding for international agencies, including international agricultural research centres. The absence of such agencies forces any decision-making and work on international funding to ministries and other agencies with no structures nor experience in handling funding for international agencies.

The development policy communities across Asia need to engage with the public authorities to advocate for improved levels of investment in R&D in both national systems as well as international R&D centres.

CONCLUSION

An examination of trends in support for global public goods - particularly international agricultural research over the last few decades, clearly indicates that there has been a steady erosion of financing from Western, developed countries.

Moreover, the decrease in Western funding for agricultural research has taken place as the heretofore aid-recipient economies have grown, with many "graduating" from aid-eligibility and some even attaining the status of donors. The key challenge at this stage is how to enable the former aid recipients to fund the agricultural research that they have heretofore benefited from. The key actors in the transformation are the international agricultural research centres themselves. However, a key question that remains to be answered is whether the IARCs are themselves capable of shifting to new sources and modes of funding for their research missions.

Climate Geoengineering

Uncertainties and Implications

ANM Muniruzzaman

INTRODUCTION

Although research on Geoengineering is still in the primary stage, the discourse is having an exponential increase in attention within global climate discussions. It is being considered as a last-resort method to address the potential impacts of global climate change. As the global temperature is now higher than pre-industrial level, we see frequent events of climate disaster that brings miseries for millions of people worldwide. If this pace continues, according to Carnegie Climate Geoengineering Governance Initiative, world temperature would increase at 3°C that will bring extreme catastrophe worldwide. Therefore, many experts argue, mitigations measure alone will not suffice to address climate change. Direct intervention on global climate system will be required.

However, as geoengineering involves with large-scale intervention on the global climate system, many are taking a vehement stand against it. A number of methods are employed within geoengineering. The governance structure of geoengineering is increasingly discussed in international forums. Along with some potential impacts on the global climate, geoengineering will bring some security implications.

WHAT IS GEOENGINEERING?

Geoengineering denotes large-scale direct human intervention on the Earth's natural system to counter the adverse impacts of climate change. Geoengineering is often considered as the last option to save the Earth from the worst effects of climate change. In order to address the negative effects of climate change, it involves a number of methods. One method employs a number of tools to divert a significant portion of sunlight from reaching the Earth's surface and, thus, cool down the average temperature of the Earth. However, this method has nothing to do with curbing carbon

dioxide emissions from the Earth's environment. Another way deals with the extraction of carbon dioxide directly from the Earth's atmosphere and, thus, mitigate climate change effects.

ORIGIN

The idea of geoengineering dates back over 50 years. In 1965, US President Lyndon B. Johnson's Science Advisory Committee published a breakthrough report named "Restoring the Quality of Our Environment" where they warned of adverse impacts of fossil fuel emissions. The report requested "deliberately bringing about countervailing climatic changes". Similar to the tools to address climate change impacts being discussed presently, the tools suggested in the report included "raising the albedo, or reflectivity, of the Earth."[120]

However, the idea of throwing small particles in the space in order to enhance sunlight reflectivity came in 1997 when Edward Teller, a Hungarian-American theoretical physicist, along with other scientists made suggestions for the first time to conduct research and employ small reflective particles to decrease solar radiation and, thus, counter the impacts of fossil fuel burning.[121]

However, geoengineering did not get wider public attention until 2006 when Paul J. Crutzen published an essay on this topic which paved the way to extensive research on geoengineering issues.[122]

METHODS[123]

There are two major methods under geoengineering and each leads to different security concerns. One is Solar Radiation Management (SRM) and another is Carbon Dioxide Removal (CDR). They are described in detail below.

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120 "Restoring the Quality of Our Environment". Report of The Environmental Pollution Panel : President's Science Advisory Committee. November, 1965.

121 "Global Warming and Ice Ages: Prospects For Physics-Based Modulation Of Global Change". Lawrence Livermore National Laboratory. 1997.

122 "The Hidden Dangers of Geoengineering". *Scientific American*. 2008.

123 "What Is Geoengineering?". Oxford Geoengineering Programme. Last accessed on June 19, 2018.

Solar Radiation Management

The increase in global temperature is considered the main reason behind climate change. Solar Radiation Management (SRM) is being considered as an important method to lower the global temperature. SRM implies developing artificial mechanisms so that solar radiation can only reach the Earth's surface at a controlled level. It incorporates a number of mechanisms.

▶ **Cloud modification**: Clouds can reflect solar radiation back into space and also trap heat inside, playing a similar role to greenhouse gases. So, researches are being undertaken to examine if clouds can be modified in such a way that they do not trap much heat. This can be done by imposing tiny particles such as pollen or desert dust into certain kinds of clouds. Thus, clouds containing less heat can cool the planet. However, concerns have been expressed that this process may form clouds in some other places where clouds did not exist before and subsequently result in much more heat trapped in the environment.

▶ **Float mirror**: One tool is to float mirrors in the space so that they may reflect back a share of sun rays away from the Earth and thus lower global temperature. This tool can be employed in a number of ways. One is implanting a giant mirror between the Earth and the Sun as suggested by Lowell Wood of Lawrence Livermore National Laboratory in the early 2000s. Analysis of this option suggests that this is very expensive. However, another option suggested by Roger Angel of the University of Arizona in 2006 talks about employing small mirrors in the space. This tool can block 1 to 2 per cent of sunlight reaching the Earth's surface and will be sufficient in keeping the global temperature within control.[124]

▶ **Surface albedo modification**: An increase in the reflectivity of Earth surface can drastically lower the global temperature and, thus, cool down the Earth. The Earth's surface has varying degrees of reflectivity in different regions. For example, a snowfield has a reflectivity of 90% whereas the reflectivity of sea water is just 10%. So, enhancing the albedo of a low-reflective region can be a crucial technique to cool down the Earth's temperature.

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124 "Could Space Mirrors Stop Global Warming?". *Live Science*. 2012.

▶ **Stratospheric aerosol injection**: Another possible tool is throwing sulphate aerosols in the stratosphere with the purpose of enhanced light reflectivity. This had been seen in a natural event of 1991 when the eruption from the Mount Pinatubo volcano in the Philippines ejected more than 20 million tons of sulphur dioxide and subsequently produced sulphate aerosol spreading particles in the stratosphere. These particles scattered and obstructed light from reaching the Earth's Surface. In the following two years, global temperatures declined by 0.6°. So, throwing sulphate aerosols in a controlled level can help reflect back a significant share of sunlight.

Carbon Dioxide Removal

Whereas SRM does not take into account the issue of the removal of carbon dioxide, the Carbon Dioxide Removal (CDR) approach directly deals with the elimination of carbon dioxide from Earth environment.

▶ **Afforestation**: Afforestation involves large-scale tree plantation worldwide. As a natural process, trees take in carbon dioxide. The most positive aspect of afforestation is that it has no potential side effect or does not lead to any security implication. However, this method requires a large amount of free land but increasing rates of population growth and associated urbanisation are making it difficult to employ the necessary land for it.

▶ **Ambient air capture and storage**: Sophisticated artificial trees can be developed and set up so that they can eliminate carbon dioxide directly from surrounding air and store it elsewhere.

▶ **Ocean fertilisation**: Another tool is known as "Ocean Fertilisation" implies mixing nutrients such as iron with ocean water to increase photosynthesis rate there. The higher rate of photosynthesis requires more atmospheric carbon dioxide which is absorbed in the process. Thus, atmospheric carbon dioxide declines.

▶ **Enhance soil carbon content**: Another way is to bury large amounts of charcoal that is actually a form of carbon into the soil. The burial will be done in a sophisticated way so that stored carbon cannot enter the carbon cycle.

GEOENGINEERING EFFORTS

Large-scale interventions on climate change are still in research level. However, some field level experiments have taken place recently. And preparations are underway to undertake large-scale experiments in the near future. One small-scale intervention that has already been undertaken and a comparatively bigger intervention that is under planning to be executed in the near future are discussed below.

GEOENGINEERING EXPERIMENT BY RUSS GEORGE[125]

An American businessman named Russ George made a private geoengineering experiment. He dumped around 100 tonnes of iron sulphate into the Pacific Ocean as part of a geoengineering scheme near the west coast of Canada. The iron has given birth to an artificial plankton bloom that covered an area as large as 10,000 square kilometres. The objective of the experiment was that the plankton would consume carbon dioxide from the surrounding environment and would sink to the ocean bed decreasing the density of carbon dioxide in the climate. This tool is known as "Ocean Fertilisation".

However, with an increased amount of plankton in the environment, the surrounding ecosystem was adversely affected leading to drastic changes in the food cycle, producing toxic tides, and severing ocean acidification.

STRATOSPHERIC CONTROLLED PERTURBATION EXPERIMENT (SCOPEX)[126]

Stratospheric Controlled Perturbation Experiment (SCoPEx) is a scientific experiment that is being planned to be executed in the United States. The possible date for the experiment has not yet scheduled. The objective of the experiment is to understand the impact of stratospheric aerosols on the global climate. The experiment will find the answers of how the particles will interact with one another in the stratosphere, the consequences of their interaction with solar and infrared radiation, and how they result in the loss of ozone layer.

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125 **"**World's biggest geoengineering experiment "violates" UN rules". The Guardian. 2012.

126 "Stratospheric Controlled Perturbation Experiment (SCoPEx)". Keutsch Research Group, Harvard University. Last accessed on July 10, 2018.

As part of the intervention, a balloon will be flown 20 km high in the sky. The balloon will release materials such as calcium carbonate weighing 100g to 1 kg in an area of 1 km long and 100 metre in diameter. The equipment in the balloon will be used to measure atmospheric chemistry and scattered light.

RISKS AND CRITICISM

Extensive research and analysis suggest that geoengineering can bring some adverse effects on the global climate. The majority of the issues are described below.

▸ Global business interest: It is argued that the main objective of geoengineering research and implementations are to change attention from mitigation strategy to address climate change. Global establishments of oil industries are the main stakeholders in this regard. As part of their business interest, they stand in favour of carbon emissions. Instead of a sincere commitment to curb carbon emission, they have sorted out climate engineering.

▸ Not solving the original problem: Solar Radiation Management deals with lowering the global temperature but it has nothing to do with the root cause of climate change which is the increased presence of carbon dioxide and other greenhouse gases in the climate. It does not speak about curbing carbon dioxide and greenhouse gas emissions. As a result, the geoengineering technique may check global temperature within an upper limit but it will not solve other consequences of climate change such as increased acidification of the seawater due to the higher level presence of carbon dioxide.

▸ Depletion of ozone layer: The sulphate aerosol that will be thrown in the stratosphere will slow or even reverse ozone formation. The depletion of the ozone layer will bring health hazards among people. A significant decrease in the ozone layer will drastically reduce rainfall. The decreased rainfall will be acidic. The point to note here is that the potential adverse effects of aerosol have not been tested yet. So, there may more unknown consequences. \

▸ Impact on Sustainable Development Goals: Geoengineering will create barriers to achieving Sustainable Development Goals (SDGs).

SDGs directly ask to reduce greenhouse gas emissions. However, resorting to other techniques to address climate change effects, geo-engineering overlooks the importance of curbing carbon dioxide emissions.

▸ Security Implications of Geo-engineering: As geoengineering deals with direct intervention on the global environment, it brings about many security implications. Some of the major security implications of geoengineering are discussed here.

▸ Unknown and uncertain consequences: The most serious issue of concern is that the consequences of geoengineering are unknown and uncertain. As geoengineering is still under research phase and the potential techniques have not been tested on a considerable scale, we do know the security threats it will pose to global climate. Neither have we game-planned nor have done any modelling on potential adverse consequences of its deployment on an already fragile climate. With huge uncertainties, it is quite likely that the impacts will go beyond our control leading to fatal consequences on global climate.

▸ Trigger to "weather war": Also, there is a high possibility that in the guise of addressing the global climate, geoengineering technology will be weaponised. Advanced countries can exploit geoengineering for their military and political ambition over other countries. As a piecemeal application of geoengineering will produce new troubles, a comprehensive approach is required. The deployment mechanism of geoengineering is too sophisticated for civilian institutions to effectively handle it. Hence, there will be the need for military expansion. Thus, geoengineering might trigger a race for military expansion and geoengineering might be exploited for military purpose.

▸ Large military establishments in the duty of implementing geoengineering may be target of militant or military attack. Competition among countries over geoengineering will likely militarise the space. Mistrust and suspicion among governments will rise as countries can deploy geoengineering for narrow benefits with detrimental costs of other nations. Therefore, the suspicion and blame-game can give rise to "weather war".

▸ Continuation of the intervention: Once a geoengineering program is undertaken, it must be continued for an extended period of time.

If the process is stopped abruptly, we may experience termination shock. For example, if SRM is employed and the emission of carbon dioxide continues at current pace, with the presence of large greenhouse gas at the atmosphere, the sudden cessation of SRM tools will lead to dramatic increase in temperature. This sudden stop will negate the success of geoengineering that has been achieved so far and the temperature will shoot up again in a dramatic rate resulting in large scale catastrophe on the Earth.

GOVERNANCE STRUCTURE NEEDED

Right now, a huge opaque condition exists in the area of geoengineering. There is no universally accepted oversight body to monitor the issue. Lots of transparency prevails regarding research and experimentations.

However, some researchers at Oxford University have made five principles that may work as a guide behind geoengineering research and implementation. The short version of "Oxford Principles"[127] are written below:

▸ Principle 1: Geoengineering to be regulated as a public good.

▸ Principle 2: Public participation in geoengineering decision-making

▸ Principle 3: Disclosure of geoengineering research and open publication of results

▸ Principle 4: Independent assessment of impacts

▸ Principle 5: Governance before deployment

As there is no UN body to govern geoengineering, it is arduous to keep updated on research and experiments on geoengineering that is going on worldwide. So, it is high time we fixed the governance structure to avoid unmanageable circumstances in the future. Wider information debate on each dimension of geoengineering technology at international level is needed.

We need to set the rules and regulations of this application. An international body to oversee and regulate the mechanism is needed perhaps under UN umbrella. There should be a verification regime to accurately monitor

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127 "What Is Geoengineering?". Oxford Geoengineering Programme. Last accessed on June 19, 2018.

the impacts after deployment. There is a high possibility that everything will not go on as planned. So, contingency planning should be made ready beforehand at a global level.

PUSHING FOR AN AGREEMENT

Till today, there is no global agreement or umbrella body to oversee the research and implementation of geoengineering techniques. However, pressures are being made to reach an international agreement regarding the deployment of geoengineering methods.

On May 22, 2018, Carnegie Climate Geoengineering Governance Initiative (C2G2) at the U.N. Environment Programme called for "international agreements to help prevent the deployment of solar geoengineering unless (i) the risks and potential benefits are sufficiently understood, and (ii) international governance frameworks are agreed."[128]

However, David Keith, a scientist of applied physics at Harvard University, asked for no restriction on geoengineering research. According to him, as long as the research is safe, it should not be stifled. He said, "I think it's really important that research be, as much as possible, more open—that there be a high level of transparency about research funding, about research goals, that it not be militarised,". "I'd love to see more international cooperation, including through climate agencies like the WMO [World Meteorological Organisation] that coordinate international research on climate. That, I think, is really useful."

Increased public attention and growing research on geoengineering will possibly push the UN to reach an agreement on deployment of geoengineering tools.

CONCLUSION

There should be a global moratorium to undertake large-scale geoengineering intervention on climate until everything is in place – rules and regulations are formulated and accepted at a global level; sufficient level of

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128 "Paths toward decisions on solar geoengineering". Carnegie Climate Geoengineering Governance Initiative. April 25, 2018.

research and pilot experiments are made. Recent findings regarding geo-engineering must be transparent and open access for all. A global research pool has to be formed.

We always should keep in mind that while dealing with climate change, mitigation strategy should be the main priority. Geoengineering mechanism should be considered as the last option available.

Disruptions in the Environment and Climate Change

Minha Lee, Serim Lee, Yongsung Cho

Among a long list of "have-to-be-dealt-with" for the generations to come, the environmental sustainability comes at the top. The signs of disruptions in the environment differ regionally, nationally and globally. Some suffer from exacerbating air-water qualities (i.e. increasing concentration of fine dust and particulate matters; highly polluted fishes from contaminated waters), some from extreme weather conditions (e.g. increasing frequency and severity of storms, cyclones and hurricanes), while others face the increasing risk of permanent displacement by sea-level rise and desertification. On the other hand, the evidence of climate change are universal; ranging from the acidification of warmer seawater, changing temperature, to the collapsing food chains. This

FIGURE 1
Natural disaster occurrence and global mean surface air temperature
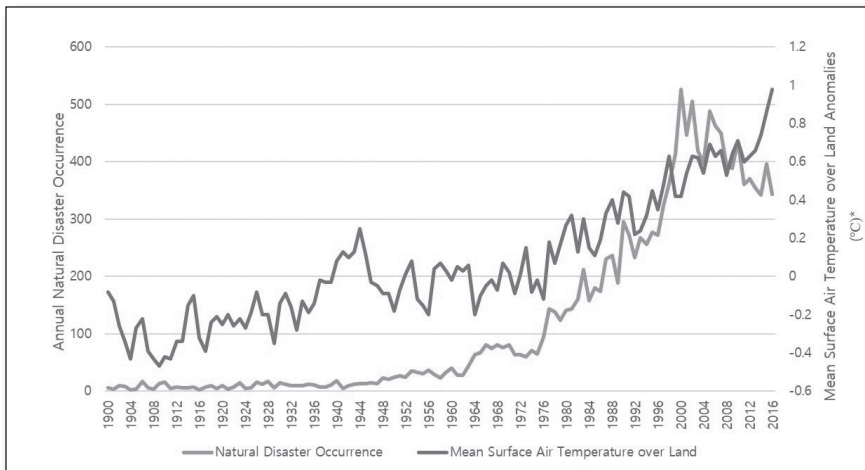
Source: 1) Natural disaster occurrence: EM-DAT – Universite Catholique de Louvain (UCL) - CRED, D. Guha-Sapir – www.emdat.be, Brussels, Belgium; 2) Mean temperature: NASA GISS – https://data.giss.nasa.gov/
* Temperature anomalies indicate how much warmer or colder it is than normal for a particular place and time. Normal, in this case of NASA GISS analysis, is the average over the 30-year period 1951–1980 for that place and time of year.

indicates that the nature of the disruptions in the environment and climate change is both area-specific and universally general in consequences as the Earth is one and the environment is all connected organically. In this regard, disruptions in the environment and climate change is clearly both a national and global agenda that requires close cooperation from all nations.

While the deadliest consequences of environmental disruption and climate change that threatens the future generation are in the global gradual-onset forms (environmental quality degradation, acidification, desertification and global warming), the area-specific sudden extreme weather events (tsunami, flooding, typhoon and hurricane) pose immediate disaster risks to all nations. As illustrated in [Figure 1], the number of natural disasters surged, alongside the mean air temperature, since the 1980 Economics Boom. The critical point of this, however, is that the impacts and costs of such disaster risks differ for each area irrespective to the characteristics of the actual disastrous hazard. It is because the disaster impacts result from the interaction of three elements: 1) the hazard itself, including the likelihood of occurrence, 2) the population and wealth exposed to the hazard (exposure), and 3) the community's ability to withstand its impact (vulnerability and resilience) [Brooks and Adger, 2003; Peduzzi et al. 2009; Thomas, Albert, and Hepburn, 2014]. In this modern world, the second point on exposure may serve more as a risk determinant factor than the first (hazard itself) in the light that a natural event, even a record-breaking one in size and severity, is likely to go unnoticed if the striking point is an uninhabited island. The importance of exposure, in turn, signifies the cruciality of the third point on vulnerability and resilience.

IPCC (2012) showed that poorer economies are more vulnerable because a higher share of their population lives in marginalised urban areas with poor infrastructure. According to Germanwatch (2016), nine of the ten most affected countries between 1996 and 2015 were developing countries in the low to low-middle income country group, with Mozambique, Dominica and Malawi ranking at the top in 2015 [Table 1]. Weak government capacity, less educational attainment and illiteracy, lack of basic facilities, less well-built homes and other insufficiencies of less developed nations are also found to attribute to disaster susceptibilities [Brooks, Adger and Kelly, 2005; Toya and Skidmore, 2007]. Adaptive capacity that determines resilience is associated with levels of governance and civil and political

TABLE 1
Climate risk index 2015: The 10 most affected countries*

Ranking 2015 (2014)	Country	CRI score	Death toll	Deaths per 100,000 inhabitants	Absolute losses (mill. US$ PPP)	Losses per unit GDP in %	Human Development Index 2014**
1 (23)	Mozambique	12.17	351	1.25	500.07	1.499	180
2 (138)	Dominica	13.00	31	43.66	611.22	77.369	94
3 (60)	Malawi	13.83	111	0.61	907.98	4.451	173
4 (10)	India	15.33	4,317	0.33	40,077.22	0.501	130
5 (29)	Vanuatu	20.33	11	4.09	278.86	40.650	134
6 (94)	Myanmar	20.83	173	0.33	1,359.65	0.479	148
7 (138)	The Bahamas	22.83	33	9.07	80.64	0.904	55
8 (118)	Ghana	23.33	267	0.99	306.28	0.265	140
8 (34)	Madagascar	23.33	118	0.49	228.04	0.642	154
10 (62)	Chile	25.17	39	0.22	2,652.69	0.627	42

Source: Germanwatch 2017, p.7

Note: * Only weather related events – storms, floods, temperature extremes and mass movements (heat and cold waves) – are incorporated. Geological incidents like earthquakes, volcanic eruptions or tsunamis, are not taken as relevant in this context as they do not depend on the weather, and therefore, are not climate-related. Furthermore, an assessment of continuous changes of important climate parameters are also neglected as this is event-related examination. In simple terms, a long-term decline in precipitation that was shown in some African countries as a consequence of climate change cannot be displayed by the CRI.

**Human Development Index 2014 from UNDP (2015) Human Development Report, pp.208–211. The Human Development Report 2015 indicates the Human Development Index for the year 2014.

rights that countries with strong institutions and higher levels of government spending contribute to strengthening national capability to withstand initial disaster shock [Brooks, Adger and Kelly, 2005; Kahn, 2005; Toya and Skidmore, 2007; Noy, 2008]. Germanwatch (2016) denoted that loss of life and personal hardship is much more widespread in low-income countries, despite the generally higher absolute monetary losses in richer countries. Such a trend concurs with the larger climate change and disaster-induced displacement and migration observed in socioeconomically weaker regions.

For this multifaceted nature of environmental disruption and resulting climate change, no single action can solve all. The uncontrolled wastes, including non-biodegradable plastics, are now found in form of the Great

Pacific Garbage Patch in the middle of the Pacific Ocean.[129] Various model analyses report different parts of the world experiencing various types of consequences of doubled atmospheric carbon dioxide (CO2) concentration: 1) the greatest change in the 20-year return values of daily maximum temperature is expected in central and southeast North America, central and southeast Asian and tropical African where a decrease in soil moisture content is also projected, 2) large extreme temperature increases anticipated in North Africa, 3) the west coast of North America to experience increased precipitation resulting in increased soil moisture accompanied by moderate increase in extreme temperature [Mearns et al., 1995; Gregory and Mitchell, 1995; Zwiers and Kharin, 1998; and Meehl et al., 2000]. Even with these simple examples, the excessive wastes produced in everyday lives need to be faced, a biodegradable material that can displace plastics should be invented soon and the forests should be rebuilt instead of deforestation over development. Moreover, the anthropogenic increase of atmospheric CO2 concentration must be slowed down to prevent further global warming.[130]

No item is an easy task as it is tied with the current market economy. Under the name of globalisation, producers went internationally for both the cost reduction on the production side and creation of new markets on the demand side. With these efforts, many more nations became engaged in this global market chain, namely the Four Asian Dragons (Hong Kong, Singapore, South Korea and Taiwan) and BRICS (Brazil, Russia, India, China and South Africa). The consequences of remarkable economic development became evident in a noticeable increase in carbon dioxide emission and energy use as tabulated in [Table 2]. This implies that the current market economy relies too heavily on the production-consumption cycle provoking endless consumption resulting in excessive use of energy and, hence, wastes (both garbage and pollutants emissions) [Miketa & Mulder, 2005; Costantini & Martini, 2010; Ozturk, 2010; Payne, 2010; and Vivid Economics, 2013].

What is required to prevent further environmental degradation is to cut the link between economic development and excessive use of energy –

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129 Bertoli, Andrea (2015) "How our Trash Affects the Whole Planet", Green Living Ideas, https://greenlivingideas.com/2015/04/24/how-our-trash-affects-the-whole-planet/

130 Tett et al.(1999) published global climate model study findings that greenhouse gases, sulphate aerosols, and solar variability may have all played important roles in twentieth century climate change.

TABLE 2
Energy use and carbon dioxide emission in major countries

Country	Energy Use (kg of oil equivalent per capita)			Carbon Dioxide Emission (metric tons per capita)		
	1971	2014	Change (%)	1960	2014	Change (%)
Australia	3,990	5,328	33.5	8.6	15.4	79.1
Brazil	714	1,485	108.0	0.6	2.6	333.3
China	465	2,237	381.1	1.2	7.5	525.0
Canada	6,476	7,876	21.6	10.8	15.1	39.8
Denmark	3,971	2,873	−27.7	6.5	5.9	−9.2
France	2,947	3,658	24.1	5.8	4.6	−20.7
Germany	3,861	3,779	−2.1	11.6*	8.9	−23.3
Hong Kong SAR, China	742	1,970	165.5	1.0	6.4	540.0
India	268	637	137.7	0.3	1.7	466.7
Indonesia	297	884	197.6	0.2	1.8	800.0
Japan	2,531	3,471	37.1	2.5	9.5	280.0
South Korea	516	5,289	925.0	0.5	11.6	2220.0
Singapore	1,292	5,122	296.4	0.8	10.3	1187.5
South Africa	1,935	2,696	39.3	5.6	9.0	60.7
Sweden	4,681	4,966	6.1	6.6	4.5	−31.8
Switzerland	2,557	3,060	19.7	3.7	4.3	16.2
Thailand	361	1,970	445.7	0.1	4.6	4500.0
United Arab Emirates	3,630	7,769	114.0	0.1	23.3	23200.0
United Kingdom	3,685	2,777	−24.6	11.2	6.5	−42.0
United States	7,645	6,957	−9.0	16.0	16.5	3.1
Vietnam	297	655**	120.5	0.2	1.8	800.0

Source: World Bank Data (https://data.worldbank.org/)
Note. * Data on Germany is since 1991 as the data was collected since its unification
 ** The latest data on Vietnam's energy use is in 2013

namely fossil fuels (coal, shale, oil and gas) burning. This is not an impossibility as the energy use has been decoupled from economic growth in recent decades among the developed economies.[131] Ecofys(2015) estimated that the energy productivity defined as GDP per unit of energy used increased at an average 1.3% per year worldwide between 2001 and 2011. As tabulated in [Table 1], the increase in the energy used and resulting CO2 emission

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131 Vivid Economics. 2013. *Energy efficiency and economic growth: Report prepared for the Climate Institute.* June. Vivid Economics: London.

TABLE 3
Energy productivity index (Top 50)

Rank	Country	Productivity	Rank	Country	Productivity
1	Hong Kong SAR, China	456	27	France	186
2	Colombia	330	28	Saudi Arabia	181
3	Singapore	329	29	Pakistan	174
4	Switzerland	310	30	Malaysia	172
5	Peru	287		*OECD Member Average*	*171*
6	Philippines	256	31	Poland	165
7	Italy	246	32	Thailand	163
8	Portugal	242	33	Belgium	162
9	Spain	236	34	India	159
10	Turkey	234	35	Sweden	158
11	United Kingdom	231	36	Australia	150
12	Bangladesh	228	37	United Arab Emirates	148
13	Algeria	225	38	United States	143
14	Egypt, Arab Rep.	224		*World*	*143*
15	Norway	224	39	Nigeria	138
16	Greece	220	40	Venezuela, RB	137
17	Germany	220	41	Vietnam	135
18	Austria	217	42	Korea, Rep.	134
19	Netherlands	215	43	Czech Rep.	131
20	Brazil	210	44	Canada	118
21	Iraq	207	45	Iran, Islamic Rep.	117
	European Union Average	*206*	46	China	98
22	Mexico	201	47	Russian Federation	92
23	Chile	201	48	South Africa	85
24	Japan	196	49	Kazakhstan	85
25	Indonesia	195	50	Ukraine	60
26	Romania	192			

Source: Ecofys (2015). p.10. [https://www.ecofys.com/files/files/the-2015-energy-productivity-and-economic-prosperity-index.pdf]
Unit: Billions of Euros of GDP per exojoule of energy consumed
Note. The 50 countries chosen are the world's 50 largest based on purchasing power parity adjusted GDP

in the developed economies over the same 43 years is reported smaller, if not decreased, than that in developing economies. Although a large part

of this differentiation between the developed and developing economies lies in the globalisation of the production sites (major production sites that consume and emit much have moved from developed to developing economies for cost reduction and regulation evasion in last decades), the energy productivity and efficiency clearly contributed to some extent. The countries that listed on the top of the [Table 3], with strong energy productivity performances, have commonly evolved away from energy and towards a service-driven economy, resulting in a lighter energy footprint. Hong Kong, which came in on the top, has become a nearly 100% service-based economy, since the economic and political integration with China in 1997, having outsourced most of its manufacturing to Guangdong province. Singapore (3), Switzerland (4), and the United Kingdom (11), those closely following Hong Kong fall in the same category. Yet, the relatively strong performances from global industrial manufacturers, Germany (17), Japan (24) and France (27) demonstrate the possibility of achieving high-quality industrial performances in manufacturing part energy efficiently. Germany ranking 14th on energy productivity improvement, with an average 2.27% annual improvement in the last decade, is also noteworthy.

The issue now can be summarised into two categories: mitigation and adaptation. First, and fundamentally, is systematic and technological development to launch a renewed Industrial Revolution to set the world onto a sustainable path. It is time for the world to move on from the fossil fuel energy empowered era opened by the invention of the steam engine having learned the deadly downside. As the Stone Age did not end because the world ran out of stones, the Oil Age must be ended for a better source of energy. The term "better" may not mean cheap or more convenience, but more environment-friendly and, hence, more suitable for sustainable development of civilisation. For this end, with strong policy support, the R&D efforts in the fossil fuel sector to constantly lower the costs should be replaced with competitive development of clean energy source that is stable and safe to be served as a new growth engine. Second, the temporal strategic approach is global governance and cooperative spirit to drive technical convergence in the field of climate change adaptation for the developing economies to exploit their "advantage of backwardness" [Gerschenkron, 1952]. The latest energy efficiency improving technologies, such as hydrogen production, storage and transport, superconducting global electric grids, and geoengineering, in addition to the traditional energy-saving strate-

gies should be transferred to the developing economies to prevent them from making the same mistake already done by the developed economies unknowingly. Furthermore, disaster risk management skills, such as more accurate forecasting, improved early warning systems and better evacuation procedures, and necessary financial support must be transferred in time for the vulnerable regions to be better equipped for survival. As Isaac Newton said, the world should see further by standing on the shoulders of giants rather than leaving the latecomers to fall into the same traps.

Preparedness or Prevention

The Direction of Natural Disaster Response in the Philippines

Grace Jamon

In 1988, then Philippine President Corazon Aquino signed Proclamation No. 296, declaring every first week of July to be "Natural Disaster Consciousness Week".[132] This came in response to the rising international consciousness on the effects of global warming, marked by the formation of the United Nations Environment Programme in 1972 and the creation of the Intergovernmental Panel on Climate Change in 1988. In schools, it led to week-long celebrations of the environment like they would for the *Linggo ng Wika* or Week of Language — students were encouraged to make posters depicting trees and the planting of them in between lectures on the environment that they only half-listened to, often resulting in even more trash than usual for their janitors to clean up. The National Disaster Coordinating Council, which was formed as a result of the Proclamation, held seminars and events encouraging people to segregate their trash at least for one week in the year. Former President Joseph Estrada decided to extend the celebrations to the whole month of July in 1999 through Executive Order No. 137. The rationale behind this was to give national government agencies ample time to implement more effective, comprehensive, and sustainable projects toward the betterment of the Philippine environment. The subject matter was also broadened to include "man-made disasters and other emergencies within its scope..."[133] Schools then enforced trash segregation on campus, held periodic showings of Al Gore's An Inconvenient Truth, and invited disaster preparation specialists to teach the students what to do in case of an emergency — from loading an injured person on a stretcher to how to use a fire extinguisher. With more autonomy to decide how they were to celebrate National Disaster Consciousness Month

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132 "Proclamation No. 296, S. 1988", Official Gazette of the Republic of the Philippines, http://www.officialgazette.gov.ph/1988/07/29/proclamation-no-296-s-1988/.

133 "Executive Order No. 137, S. 1999", Official Gazette of the Republic of the Philippines, http://www.officialgazette.gov.ph/1999/08/10/executive-order-no-137-s-1999/.

bestowed upon them by the new EO, local governments competed against each other to see which one was more environmentally friendly. The Coordinating Council encouraged these competitions from time to time through cash prizes and nationwide acknowledegment of the most environmentally friendly city. These acts were made by the Philippine government to formally acknowledge the threat of climate change and to send the message that they were doing something about it.

Despite all of this, the Philippines stood completely vulnerable in the face of disaster. Between 2010 and 2015, a total of 60 destructive tropical cyclones entered the Philippine Area of Responsibility (PAR). Of these, 28 spiralled into destructive typhoons, including 2011's Tropical Storm Washi and the infamous Typhoon Haiyan of 2013 or Tropical Storm Sendong and Super Typhoon Yolanda as the two were locally known, respectively. Sendong and the years directly before and after it resulted in 11,716 casualties and the partial or complete destruction of 625,727 homes. 2013 would more than triple those numbers with 36251 casualties, even more injured or missing, and 1,291,060 homes damaged or destroyed.[134] In most cases, the people found themselves surviving by the skin of their teeth, stuffed into overcrowded evacuation centres with only the clothes on their backs, and desperately waiting for meagre food aid despite the billions upon billions in donations from all over the world. Some of them were able to get back on their feet — rebuilding partially destroyed homes and re-opening businesses — while some still cry for shelter to this day, five years and a presidency later. In fact, a National Housing Authority (NHA) report from November 2017 found that while nearly 40% of the 200,000 houses needed for Yolanda survivors have already been built, only 13% are being occupied due to local government units' (LGU) late submission of their lists of intended beneficiaries. When questioned for their tardiness, LGUs claimed that they were not yet focused on housing as their resources remain in food, first aid, and temporary shelter.[135] Reports do not consider the mental states of the victims, some of whom flinch at the first drops of rain against their windows if

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134 Gwen De La Cruz, "IN NUMBERS: Typhoons in the Philippines and the 2016 Polls", Rappler, 19 March 2016, https://www.rappler.com/move-ph/issues/disasters/126001-typhoons-enter-philippines-fast-facts.

135 Patty Pasion, "Only 13% of Homes Allotted for Yolanda Survivors Are Occupied – NHA", Rappler, 7 November 2017, https://www.rappler.com/nation/187593-yolanda-fourth-year-anniversary-housing.

they were lucky enough to even have one. Even if survivors found themselves with a home, many are still without a steady source of income due to the damage done to agricultural fields by the storms and the receding marine population brought by overfishing, the practice of blast fishing, and recent massive oil spills such as those of Guimaras[136] and the Tubbataha Reef[137].

The statistics above do not even cover earthquakes and volcanic eruptions that have plagued the Philippines. Recently, prospective homeowners have become more conscious of whether or not they would be buying property along the Philippine Fault System. This was perhaps sparked by the 2013 Bohol earthquake. The 7.2 magnitude earthquake took 222 lives, injured 976 people, and damaged or destroyed more than 87,500 structures, including the airports of Tagbilaran and Iloilo, the historic Basilica Minore del Santo Niño, and the world-famous Chocolate Hills.[138] The quake was the deadliest earthquake in 23 years. It was said to have been felt all over the Visayas and was equivalent to 32 Hiroshima bombs.[139] It came only a few months before Yolanda, further eroding the area's ability to withstand the storm surge. While the Bohol earthquake survivors are better off than those of Yolanda, the event still inspired a fear of earthquakes in all Filipinos, leading to nearly monthly earthquake drills, frequent television reminders to seek shelter under firm tables in the event of earthquakes, and the emergence of a plethora of online materials to find out if you live on a fault line.

The statistics also do not mention the cataclysmic 1991 eruption of Mt. Pinatubo. The volcano was giving indications toward its eruption three

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136 "Large Oil Spill in the Philippines Threatens Marine Ecosystem", WWF, 17 August 2006, http://wwf.panda.org/?78300/Large-oil-spill-in-the-Philippines-threatens-marine-ecosystem.

137 "PCG to Check Damage to Tubbataha Reef after US Warship Grounding", GMA News Online, 18 January 2013, http://www.gmanetwork.com/news/news/nation/290868/pcg-to-check-damage-to-tubbataha-reef-after-us-warship-grounding/story/.

138 Eduardo del Rosario, *SitRep No. 35 re Effects of Magnitude 7.2 Sagbayan, Bohol Earthquake*, report prepared by the National Disaster Risk Reduction and Management Council, 2013. https://web.archive.org/web/20131214193612/http://www.ndrrmc.gov.ph/attachments/article/1108/NDRRMC%20Update%20SitRep%20no.%2035%20re%20Effects%20of%20M7.2%20Bohol%20EQ%2C%203Nov2013%2C%206AM.pdf

139 Jeannette I. Andrade and Nikko Dizon, "Bohol Quake "like 32 Hiroshima Bombs"", Inquirer News, 16 October 2013, http://newsinfo.inquirer.net/507373/bohol-earthquake-strongest-to-hit-visayas-and-mindanao-in-over-20-years.

months before the June eruptions, starting with small earthquakes in March and April caused by magma rising towards the surface that blasted three craters on the north flank of the volcano.[140] The first to notice these signs were the *Aetas* who lived in villages on the volcano. They immediately informed the Philippine Institute of Volcanology and Seismology (PHIVOLC) and the *Aetas* were promptly evacuated, with the exception of a few who refused to leave their homes and subsequently perished in the eruptions. Initially, they were relocated to nearby towns but when the situation worsened on June 15, even those towns became unsafe. The *Aetas* were evacuated to even further locations along with the *Kapampangan* with whom they initially sought refuge.[141] It seemed no one in the country could truly escape the effects of the eruptions, however, as snow-like ash fell all over the country. In the nearby areas where the ash fell thickest, thousands of roofs collapsed when strong winds blew and heavy rains made the ash wet, killing more than 350 people and collapsing homes and even two large US military bases in Clark and Subic Bay. The spread of disease within the overcrowded evacuation centres and sudden mudflows brought the death toll to more than 722.[142] Mt. Pinatubo's eruption was the second-largest eruption of the century and the largest to affect a densely populated area. It displaced more than 200,000 people, some of which remain transient to this day. The *Aetas* who attempted to return to their villages found it to be unliveable, the layers upon layers of volcanic materials rendering the land untillable. The effects are not even limited to the Philippines as nearly 20 million tons of sulphur dioxide were injected into the stratosphere[143], reducing the density of the ozone layer and leaving a portion of the Earth more vulnerable to the sun[144]. When the Mayon volcano started showing signs of eruption earlier this year, the citizens of Albay were reminded of the devastation of the Mt. Pinatubo eruption and promptly evacuated. This did not save their fields, however, destroying around P185 million in crops,

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140 "The Cataclysmic 1991 Eruption of Mount Pinatubo, Philippines, Fact Sheet 113-97", USGS Publications Warehouse, accessed 30 June 2018, https://pubs.usgs.gov/fs/1997/fs113-97/.

141 J. Gaillard, *People's Response to Disasters in the Philippines: Vulnerability, Capacities and Resilience* (New York: Palgrave Macmillan, 2015), 111.

142 "Pinatubo", Natural Hazards Data | NCEI, accessed 30 June 2018, https://www.ngdc.noaa.gov/hazard/stratoguide/pinfeat.html.

143 "The Cataclysmic 1991 Eruption of Mount Pinatubo, Philippines, Fact Sheet 113-97".

144 "Pinatubo".

affecting at least 9,791 farmers and some 7,131 hectares of land.[145]

With all these disasters that have devastated the Filipino people, one must ask how a country that dedicates a whole month every year to disaster preparedness could be so unprepared for natural disasters and even sport an almost cavalier attitude towards climate change. The latter, perhaps, is due in part to the term "climate change" itself. By now, most people are familiar with the terms "global warming" and "climate change". This phenomenon has been talked about for many years now, and more and more reports are coming out to say that the situation is becoming worse over time. Unfortunately, while the label has led to some opening their eyes to its dire consequences, many people have also become desensitised to calls for change — choosing to view it as nature simply taking its course. This is doubly so in the Philippines, which is one of many countries that are most affected by the extreme changes in the environment. The country ranked very high in the 2016 World Risk Report in terms of exposure to natural disasters and general risk. This is related to the fact that it is located within the Ring of Fire, a fact that politicians are all too comfortable citing when asked to explain the economic performance of the country, using what Gaillard referred to as the ""natural" alibi"[146].While it is true that the negative effects of these natural disasters will affect the local economy, the effect could arguably be mitigated by effective disaster preparedness, response, and recovery practices, which have naturally been impeded by this complacent attitude.

The government seemed to have also thrown hopes of reversing climate change out the window, as evidenced by how the aforementioned "Natural Disaster Consciousness Month" has been celebrated. On paper, it is a movement to inform the Filipino people on the reality of global warming and climate change, how it affects the country, ways to prevent even more disasters, and how to prepare for them. In practice, only the lattermost goal is accomplished. The Filipino people are always bombarded with advertisements, lectures, and seminars on how to prepare for a disaster while information on the science of climate change and how to reverse it falls on

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145 Rhaydz B. Barcia, "Damage to Agriculture Due to Mayon Now at P185 Million", Rappler, 7 February 2018, https://www.rappler.com/nation/195520-agricultural-damages-crops-mayon-volcano.

146 Gaillard, *People's Response to Disasters in the Philippines: Vulnerability, Capacities and Resilience*, 3.

deaf ears. One could argue that these actions are merely a result of those in power wishing to prepare the people for the worst, but it has bred an acceptance that natural disasters will always happen, nothing can be done about it except to prepare oneself.

Moves toward reversing climate change itself are done in token gestures that can be seen in most Philippine malls today. Separate trash cans are provided for the segregation of trash, although once one opens the lid, they will find that people have thrown their trash depending on which can was nearer. Even if the people do segregate their trash, it is all collected in the same bag, presumably to be thrown to the same dump. Most groceries have also made the decision to package customer purchases in paper bags or boxes as opposed to plastic bags, despite the fact that even more paper bags are used just to package wet and frozen goods and that increasing the demand for paper is unsustainable and worsens the logging of trees. Posters about how these companies care for the environment are ubiquitous, even as they continue to pursue "innovative disruption" or "disruptive innovation".

"Innovative disruption" or "disruptive innovation" has become a popular buzzword among companies and business professionals. The term was originally coined by Clayton M. Christensen in his book *The Innovator's Dilemma*, where he explained that this describes a process by which a product or service takes root initially in simple applications at the bottom of a market and then relentlessly moves up market, eventually displacing established competitors"[147]. An example of this is the computer; most of us can recall how only very few people could afford and operate these when they first came out. Now, the majority of middle to upper-class people own one. If not, the majority of people, regardless of class, own a smartphone. Some direct implications of this type of disruption are the focus on growth. Technological advancements have made us all more acutely aware of what is out there (locally and globally) and, therefore, creates a new standard for excellence in product and service innovation. This democratisation of accessibility blows the doors open for competition and creates this "adapt or die" situation for companies that can be challenging to navigate, especially now in the age of start-ups. The indirect but relevant implication of innovative disruption in society is that the focus on growth has created this vicious

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147 "Disruptive Innovation", Clayton Christensen, 23 October 2012, accessed 25 March 2018, http://www.claytonchristensen.com/key-concepts/.

cycle, the likes of which manifest themselves in overconsumption and the growth of waste as well.

It is then fitting, perhaps, that environmentalists such as John Holdren, scientific advisor to the Obama administration should lift the term "disruption", which businesses so often prize, to form the idea of "climate disruption" to describe the adverse effect of their activities on the environment. Perhaps it could remind businesses of the large role they play in the climate crisis, and how we still have a long way to go in terms of mobilising resources towards a favourable outcome for the future. This is especially true when considering that a 2017 report created by The Carbon Majors Database, found that 100 major companies in the world alone contribute to over 50% of total carbon emissions. Perhaps, this change in label could shock people enough to acknowledge the reality that we cannot leave the earth to fate. In the words of research meteorologist, Doug Sisterson, "We"ve learned that we want to be optimists and have a positive mental attitude, and the way we deal with that is by thinking "Not all change is bad… Maybe we should start talking about climate disruption... Maybe it more accurately represents the journey we are about to be embarking upon."

The way it is, the Philippines remember and celebrate the environment in July, but proceed to further damage it for the rest of the year. This has proven to be ineffective, not only to advancing the movement to reverse climate change, but also to prepare the most vulnerable in the country for disasters. During these times, disaster preparedness drills and seminars are thrown out the window and the victims are left to be their own heroes. Holding seminars and celebrating once a year is not enough, knowing how to keep yourself safe once disaster strikes is not enough. A change in how people perceive their role toward the environment is needed and the change must be brought to those on the bottom all the way to the top.

Disruptions in Rakhine State and Its Implications to Malaysia

Puteri Nor Ariane Yasmin and Puteri Amida Afsha Afzan

INTRODUCTION

Violence and instability in Rakhine State have become one of Southeast Asia's most tragic, deplorable and sensitive socio-political conundrums with implications to not only Myanmar but its neighbouring countries as well. Indeed, developments over the past few years – namely the Andaman Sea crisis in May 2015 and attacks on Myanmar border police posts in October 2016 – highlight the extent to which disruptions in Rakhine have affected, are affecting and will continue to affect forced displacement in the region for the foreseeable future. Such developments have also reinforced the fact that forced migration is a borderless, transnational issue with profound security implications for the region.

Yet, it is not (and it has never been), in the interests of ASEAN Member States to assume internationally binding legal responsibilities for irregular people movements. The issue is that any policies adopted will be seen as welcoming of irregular migrants and encouraging an influx of people smuggling and trafficking networks, both of which can burden national systems. The European experience of handling the Syrian refugee crisis has demonstrated that forced migration can be a political and social liability to governments of the day.

However, ongoing movements of the Rohingya into Bangladesh since disruptions began in August 2017, indicate that there could be a repeat of the Andaman Sea crisis. As days go on, it is not a question of if but when boats will start to set sail from the Bangladesh-Myanmar border, which will result in an outflow of Rohingya refugees into neighbouring countries like Malaysia.

Malaysia is already facing a significant forced migration issue. The ongoing plight of the Rohingya over the years has resulted in the country shifting from a transit point to one of final destination for refugees. This serves as

a reminder that Rohingya refugees, who have already been in the country for generations, are unlikely to return home anytime soon.

What are the implications of recent disruptions in Rakhine State to Malaysia? What are the options available for the Malaysian Government moving forward? This paper will argue that, in essence, Malaysia must further develop its policy (of not having a policy) on refugees, asylum seekers and displaced people. Specifically, the Malaysian Government should consider a comprehensive policy on the Rohingya in order to better prepare for their impending arrival and its impact on the country's national interests and national security.

WHAT IS THE CURRENT SITUATION?

Since August 2017, an estimated 700,000 Rohingya have fled Rakhine State to refugee camps along the Bangladesh-Myanmar border, with an estimated 100,000 internally displaced or stuck in "no man's land" between the two countries. The overall Rohingya population in Cox's Bazar is estimated to have reached 1.1 million, with some reports stating that the largest growing camp in the area has reached 1.2 million.[148] In other words, the Rohingya crisis has shifted from Rakhine State to Bangladesh and the situation along the Bangladesh-Myanmar border is likely to deteriorate in the near future.

First, the temporary camp conditions could worsen. There are no guarantees that aid will continue, and the monsoon season could put more lives at risk and result in a public health emergency. For instance, the Rohingya have stripped away 1,650 hectares of Bangladeshi land (which estimates up to roughly US$18 million) as they rely heavily on firewood for cooking. This could increase their vulnerability due to the upcoming cyclone and monsoon seasons.[149] Furthermore, USAID has reported that the Rohingya lack basic infrastructure, are denied access to education and freedom of livelihoods, and are left dependent on emergency humanitarian relief for food and medi-

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148 Solomon, Feliz. "About 60 Rohingya Babies Are Born Every Day in Refugee Camps, the U.N Says". *TIME*, May 16, 2018. http://time.com/5280232/myanmar-bangladesh-rohingya-babies-births/.

149 "Bangladesh Begins Distributing Cooking Fuel for Rohingya Refugees". *Benar News*, May 21, 2018. https://www.rfa.org/english/news/myanmar/refugees-fuel-05212018174815.html.

cal care.[150] Strengthening humanitarian assistance to Bangladesh, in terms of food, health and social welfare, is of utmost importance to cater for the immediate plight of the Rohingya. However, history has shown that pledges of humanitarian aid are often only partially fulfilled in the end.

Second, there are reservations as to whether arrangements between Myanmar and Bangladesh of the return of displaced persons from Rakhine State can be implemented. For starters, the Rohingya continue to trickle into Bangladesh, almost on a daily basis, to escape disruptions in Rakhine. The Myanmar-Bangladesh Agreement on Rohingya Repatriation is also not a feasible or sustainable solution, as Myanmar is only accepting a small fraction of names – those with documentation. Myanmar has urged Bangladesh to start the repatriation of 1,101 verified Rohingya out of the 8,032 who have qualified for the terms of the agreement thus far (of which there are 778 Muslims and 444 Hindus).[151] The majority of the Rohingya is stateless and will consequently not qualify for return.

Furthermore, there are not many Rohingya left in Rakhine and there are uncertainties if they were to return home. The agreement does not address the legal status of the Rohingya moving forward, safeguards for the Rohingya against violence, whether the Rohingya will be allowed to return to their land, and cooperation between Myanmar's security personnel in key positions, particularly since any sign of compromise will be seen as weakness by the military.

WHAT COULD HAPPEN NEXT?

The assumption must be made that the Rohingya will remain in refugee camps in Bangladesh for the foreseeable future, before boats are being deployed for countries of final destination like Malaysia. It must be said that refugee resettlement programmes for the Rohingya to third countries also seem unlikely. Indeed, there is little sign of such programmes in the pipeline.

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150 USAID Office of Press Relations. "USAID Administrator Mark Green's Visit to Rakhine State in Burma". Last updated May 21, 2018. https://www.usaid.gov/news-information/press-releases/may-21-2018-usaid-administrator-mark-green-visit-rakhine-state-burma.

151 "Myanmar wants repatriation of 1,101 verified Rohingya". *The Dhaka Tribune*, May 18, 2018. https://www.dhakatribune.com/world/south-asia/2018/05/18/myanmar-wants-repatriation-1101-verified-rohingyas.

History has shown that the temporary refugee camps along the Bangladesh-Myanmar border could eventually become permanent settlements. The Palestinian camps in Lebanon and Jordan are notable examples, with each housing 448,599 and 2 million refugees respectively.[152] The Dadaab refugee camp in Kenya, set up in 1991, is still growing, and the more recent Zaatari camp in Jordan is also on the verge of becoming a refugee township as it caters to 80,000 Syrians.[153]

However, the status of the Rohingya camps in Bangladesh is dependent on a steady stream of financial aid coming in (of which this paper has argued there are no guarantees), and the Bangladeshi Government allowing these camps to exist for a prolonged period. Although they have generally welcomed aid for the Rohingya, there are also pressing concerns for the Bangladeshi Government that the improvement of camp conditions could lead to cementing the permanent presence of the Rohingya within its borders.

The Bangladeshi Government is also facing political pressure as elections are due at the end of the year. Locals are wary of the Rohingya overcrowding an already overpopulated country, which has resulted in accusations that Bangladesh is currently being burdened by refugees – a situation that it simply cannot afford. The Government's struggle for its own population is further compounded by climate disasters, which have killed thousands and are costing millions. Finally, there are also concerns regarding national security and public order and stability, given reports that the recent violence in Rakhine was an act of terrorism by a Rohingya insurgency group. The experiences of managing the Syrian refugee crisis in European countries like Germany, in which refugees resorted to crime and radicalisation as a means of coping with being contained in camps, also serve as a means of caution to Bangladeshis.

These scenarios indicate that refugees will start to depart Bangladesh for neighbouring countries, either on their own accord or with some encouragement by local authorities who simply cannot cope. Malaysia is likely to be

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152 "Palestine refugees: locations and numbers". *Irin News*, January 16, 2010 (last updated January 16, 2018). http://www.irinnews.org/report/89571/middle-east-palestinian-refugee-numberswhereabouts.

153 Lee, Joi. "Syria's War: Inside Jordan's Zataari refugee camp". *Al Jazeera*, April 1, 2018. https://www.aljazeera.com/indepth/inpictures/syria-war-jordan-zaatari-refugee-camp-180326115809170.html.

the most attractive destination for the majority, as it is no longer a transit country for the Rohingya. Reasons for this changeover, of which there are many, are outlined below.

WHAT ARE THE IMPLICATIONS FOR MALAYSIA?

First and foremost, Malaysia's status as a country of final destination for the Rohingya is not a new development. This transition can be attributed to a number of pull factors such as the relatively short travel distance between Myanmar and Malaysia (in comparison to other destinations), economic opportunities, religious similarities and the fact that there is already an established Rohingya community in the country who been here for up to three generations. Previous interviews have indicated, for instance, that the Andaman Sea crisis was not a "one-off" as boats dock at Malaysian shores regularly.[154] Malaysia's attractiveness is because it is a relatively well-to-do Muslim country with a demand for cheap labour and a large immigrant population.

Second, not being a signatory to the 1951 Refugee Convention and its 1967 Protocol does little to prevent refugees from entering the country. Due to a constant flow of refugees and asylum seekers into the country, Malaysia has a "responsibility to protect" vis-à-vis the principle of *non-refoulment* and the obligations of the shipmaster as outlined in international maritime law. Whether or not a country is a party to the 1951 Convention, its government has an obligation to ensure that no refugee should be returned to any country where he or she is likely to face persecution or torture. *Non-refoulment* makes an even stronger case for the Malaysian Government to facilitate and increase refugees' self-reliance and inclusion in society, particularly the Rohingya.

On the other hand, international maritime law codifies the obligation for rescue at sea in a number of instruments. According to the United Nations High Commissioner for Refugees (UNHCR), "the shipmaster has

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154   There has always been a steady stream of refugees trickling into Malaysia. However, the Andaman Sea crisis garnered media attention specifically because the boats were abandoned at sea. The influx of large numbers like those seen in the Andaman Sea crisis normally occur when there are sudden anomalies that serve as a trigger. This can include a sudden crackdown on smuggling networks, as per 2015, or an uptake of violence at the source countries or regions.

an obligation to render assistance to those in distress at sea without regard to their nationality, status or the circumstances in which they are found."[155] It is also worth mentioning that the Rohingya community in Malaysia suffers from a relatively low rate of resettlement abroad. Those who have been here for generations are either unhappy at their options for resettlement, refuse to split up with their families or prefer to remain in Malaysia. Such conditions indicate that Malaysia will continue to host a large, growing number of Rohingya in the long run.[156]

There are also expectations for Malaysia to absorb the Rohingya in Bangladesh from certain quarters, namely the Rohingya, Myanmar and ASEAN. Such expectations are the result of the Malaysian Government's outspokenness on the ongoing crisis in Rakhine. Malaysia's tough stance on the matter has included summoning the Burmese ambassador in Kuala Lumpur, a solidarity march, referrals of "genocide" and "ethnic cleansing" in its press statements and last minute cancellations of football matches in Myanmar. We should not underestimate the impact and possible implications of these developments, not only to the Myanmar Government and the wider ASEAN circle but also to the Rohingya themselves, with regards to expectations that refugees will be welcomed into Malaysia. There is also a general dissatisfaction by all ASEAN Member States with Malaysia over how it has approached the Rohingya crisis, with Malaysia being deliberately excluded from informal discussions on the issue.

HOW CAN MALAYSIA MOVE FORWARD?

In the short term, because the crisis has shifted from Rakhine State to the Bangladesh-Myanmar border, the priority should be to address the primary needs of the Rohingya. Efforts should also be focused on garnering immediate results to the humanitarian situation along the border. This necessitates a continuation of assistance and aid – such as food, health and social welfare – to ensure that camp conditions remain sufficient and do

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155 This is based on the 1982 United Nations Convention on the Law of the Sea (UNCLOS Convention Art. 98(1)) and the 1974 International Convention for the Safety of Life at Sea (SOLAS Convention Chapter V, Regulation 33(1)).

156 As of March 2018, there are 69,880 Rohingya refugees and asylum seekers registered with UNHCR Malaysia. The exact number of those who remain off the grid is unknown, although estimates have pointed to at least 150,000.

not deteriorate. Such efforts will also help to reduce the likelihood of the Rohingya departing for neighbouring countries like Malaysia. Some of the Malaysian Government's initiatives thus far include establishing hospitals in Cox's Bazar and securing funding from Saudi Arabia and the United Arab Emirates to support Malaysian efforts in Bangladesh.

Malaysia should also put pressure on signatories of the 1951 Convention and its 1967 Protocol to play a bigger role in the crisis. Regional signatories, in particular, should measure up to their international obligations with regards to resettlement and mutual assistance. It should be recognised that Malaysia hosts a large number of refugees and displaced persons who are allowed to live and earn a living albeit illegally. Despite obvious shortcomings, in practice, it appears that Malaysia does more than some countries that have signed both treaties.

In the long term, however, the Malaysian Government should re-examine its efforts to pressure Myanmar on disruptions in Rakhine State. As this paper has already established, the number of Rohingya in Rakhine State is at a minimal, and most either do not qualify for repatriation or do not want to return. And should the tables turn and conditions improve, any peaceful solution to the issues surrounding Rakhine State must involve Myanmar in order to be sustainable. Alienating the Myanmar Government, and indeed the rest of ASEAN as a result of Malaysia's position on the Rohingya will do very little to facilitate this process.

Domestically, the Malaysian Government should consider developing a "comprehensive policy" on the Rohingya in order to better prepare for their arrival when boats start to depart Bangladesh. The current "policy of not having a policy" on refugees will no longer be sufficient to address the ongoing plight of the Rohingya (both within and outside of Malaysia) and its impact on the country's national interests and national security. Such a policy will also not prevent them from coming to the country, nor is the Government's dependency on international organisations like the UNHCR is sustainable in the long run.

A COMPREHENSIVE POLICY ON THE ROHINGYA

Although a comprehensive policy on the Rohingya is not tantamount to the Government acceding and ratifying such commitments like the 1951

Convention and its 1967 Protocol, challenges and potential deal-breakers to such a policy remain. These include:

i. Will a comprehensive policy on the Rohingya lead to pressure for the Malaysian Government to have an official policy on refugees overall?

ii. Will there be domestic pushback to the idea of a Rohingya policy in Malaysia?

iii. Will there be expectations to grant citizenship to the Rohingya who have already been in Malaysia for generations?

In order to address these issues, a policy on the Rohingya in Malaysia should, first and foremost, include proper stakeholder consultation with local non-governmental organisations (NGOs), Rohingya community groups and organisations, aid agencies and international organisations. This would avoid the failure of a pilot programme that aimed to formally employ 300 Rohingya in the plantation and manufacturing sectors in March 2017, which simply did not appeal to its targeted audience.[157]

Moreover, a policy on the Rohingya should consist of three key initiatives. The first is the registration of the Rohingya with UNHCR Malaysia to ensure that refugees undergo the organisation's Refugee Status Determination process – a stringent procedure that will result in refugees receiving the most technically advanced and secure UNHCR card. Second, to cater for national security concerns, a Rohingya policy should also formalise or regularise their status in a national database and issue appropriate identification documents. These may include humanitarian visas or permits for "temporary residents" and "guests", which will reinforce the fact that a Rohingya policy will not be tantamount to naturalisation. Third, a Rohingya policy should introduce a regulated work scheme as originally planned by the Government in 2017. Besides being a competitive labour pool, refugees will be financially independent and improve their skills set. These initiatives would strengthen the Rohingya's integration capacity in Malaysia and increase their chances of being resettled overseas to third countries of final destination, particularly if there is sufficient and reliable information on them.

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157 UNHCR Malaysia contacted 4,000 Rohingya refugees, of whom only 10 per cent expressed interest in participating in the pilot programme. Out of the 400 names who were interested, only 14 eventually started on the first day in March 2017. As of August 2017, there were no refugees participating in the pilot programme.

The regularisation of status and permission to work for the Rohingya will assist in tackling the potential challenges of a Rohingya policy in Malaysia outlined above. For instance, possible spill-over effects of problems in refugee communities should be minimised if refugees are registered with proper identification and given opportunities to be self-sufficient. Any negative perceptions of refugees or backlash against these individuals by locals would be better managed if they are seen as "legal" individuals with "real" identities, as the notion of "anonymous" individuals constituting a "threat" to national security should fade. Perhaps most importantly, a national database will ensure the proper conduct of law enforcement without the arbitrary arrest, bribery, detention or deportation of refugees. This will improve local confidence in the Government's management of forced migration flows if it is able to control their borders and mitigate potential threats against public safety and security.

In essence, a comprehensive policy on the Rohingya will ensure that the Malaysian Government is prepared for their arrival, able to identify and register them once they reach Malaysia, and provide humanitarian assistance and support to these communities without compromising Malaysia's national interest and national security.

Biographies of Contributors

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Against a rapidly changing global environment, societies are now having to deal with a host of challenges to their security and way of life. Many of these challenges had a significant disruptive impact on human security. In the 21st century, how societies respond to disruption(s) and manage their transformative effects would largely be defined by the extent to which they are able to comprehend the complex consequences of such disruption on their social, economic and political institutions that shape their everyday lives.

A key element in dealing with disruption is building resilience. This was the key theme of the 3rd Annual Conference of the Consortium of Non-Traditional Security (NTS) Studies in Asia, held on 27-28 March 2018, in Singapore. This monograph compiles the papers presented by members of the Consortium. They examine the kinds of human insecurities and uncertainties brought on by disruptions, analyse the current responses by states and other actors, and point to specific recommendations on how societal resilience can be built in the face of disruptions.

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