

NATIONAL INTEREST AND WARFARE ECOSYSTEM 2: WICKED PROBLEMS FRAMEWORK AND POLICY DEVELOPMENT

Ayodele A. Otaiku

Ph.D. Scholar, Nigerian Defence Academy (NDA), Faculty of Arts and Social Science,
Department of Geography / Environmental Management , Kaduna, Nigeria.
otaiku.ajayiayodele@nda.edu.ng | aotaiku@gmail.com Mobile: +234 803 3721 219

Graphical Abstract



Abstract: *The pursuit of the national interest is closely linked to geography, strategy and contexts specific in foreign policy, anchoring remains significant and spatial to the Nation's production possibility frontier with empirical case studies of China and the United States of America. Foreign policy solutions 'desired outcome' are in 'the continuum' termed poly singularity. Public value theory, Kingdon's multiple streams approach and Baumgartner and Jones's punctuated equilibrium theory (PET) was applied as critical thinking to captures decision constructive process of national interest with focus on value streams for stakeholders with the contexts specific situation illuminated as spatial polysingularity construct in framework. China's 'Belt and Road Initiative (BRI)' Project altercasting as liberalist and realist for global economic and militarily power in East Asia. The United States energy interests drives its 'Globalization Agenda and market economies' globally. A new superpower crucible framework with win-win national interest's scenario termed 'warfare ecosystem' postulated.*

Keywords: policy development, spatial polysingularity, national interest, public value theory, globalization 4.0, foreign policy, warfare ecosystem and wicked problems framework.

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INTRODUCTION

What is Wicked Problems in Policy Development?

The terminology of ‘wicked problems’ is now firmly entrenched in the language of policy researchers and policy practitioners (Rittel and Webber, 1973; Roberts, 2000; APSC, 2007; Head, 2010). Wicked problems definitions in literatures tend towards the assumption that they are highly complex; information about the likely impact of any interventions is limited; and there is a distinct lack of agreement on their causes and the best ways of addressing these seemingly chronic and intractable problems. Examples often cited include poverty (Spicker, 2016), homelessness (Klodawsky, 2009), child protection (Gillingham and Humphreys, 2010), climate change (Lazarus, 2009), people smuggling (Gallagher, 2015), urban congestion (Greyling *et al.*, 2016), illicit drug use (Seddon, 2016), sustainability (Clark, 2007), environment (Duckett *et al.*, 2016; Levin *et al.*, 2009; Ayers and Dodman, 2010; Berkes, 2009), agriculture (Fischer *et al.*, 2012; Peterson, 2009; van Latesteijn and Rabbingeb, 2012; Otaiku, 2020), food Security (Lang and Barling, 2012; Dentoni *et al.*, 2012), and gender economic inequality (Turnbull, 2010), Table 1. The searches for ‘solutions’ are at the heart of politics (Rittel and Webber, 1973) but conflict between multiple publics is a major barrier to the type of unitary planning that is needed to address wicked problems. Yet if ‘politics’ is part of the explanation for policy responses failing to some degree in addressing wicked problems, there is far more to politics than simply conflicts between different views. Politics also involves matters such as protecting political reputation, controlling agendas and carving out particular ideological trajectories. The study of ‘politics’ as a shaper of responses to wicked problems has tended to be cross-disciplinary, ad-hoc and fragmented often giving way (understandably) to specific areas of interest in relation to wicked problems. The problem definition is spatial, requiring consensus to have a meaning (carving out particular ideological trajectories), contexts specific situation between different views (polysingularity) for solution execution in the continuum.

National interest is a tool of foreign policy to execute the aspiration of a nation rectify by law of the nation and the resultant component of ‘policy’ aspects of wicked problems. Understanding policy solutions to wicked problems entails policy formulation which and adaptive solution in the continuum for grand strategy. Ostrom (2007) who suggests that foundations of understanding may rest on:

- (i) Frameworks with a meta-theoretical language that allows theories to be compared;
- (ii) Theories that enable us to diagnose and explain a particular phenomenon; and
- (iii) Models that make precise assumptions about how a limited set of variables will interact within Certain parameters.

Table 1: Typology of wicked problems

Table 1. Comparison of Five Discourses of Design Thinking					
N/S	Founder	Background	Epistemology	Core Concept	References
1	Simon	Economics & political science	Rationalism	The science of the artificial	Schön and Wiggins, 1992
2	Schön	Philosophy & music	Pragmatism	Reflection in action	Simon, 1996
3	Buchanan	Art history	Postmodernism	Wicked problems	Buchanan's, 1992
4	Lawson & Cross	Design & architecture	Practice perspective	Designerly ways of knowing	Lawson and Cross, 2011
5	Krippendorff	Philosophy & semantics	Hermeneutics	Creating meaning	Krippendorff, 2006
		Earth Sciences , Biotechnology	Spatial Polysingularity	Everything matters for solutions analytics	van Latesteijn and Rabbingeb, 2012)
		Agriculture, Food Security	Climate Smart Agriculture	Wicked problems	Fischer et al., 2012 ; Dentoni et al., 2012
		Environment and Pollution	Sustainable development	Wicked problems	Duckett et al., 2016
6	Otaiku A.A	National Interest	Spatial Polysingularity	Policy Formulation / Warfare ecosystem	Otaiku, 2020
		Defence Strategy	Hybrid Warfare Warfare Ecosystem	Threat of War	Otaiku, 2018

This paper, therefore, seeks to make a theoretical contribution by providing what Ostrom (2007) describes as ‘general working assumptions’ about responses to wicked problems, apply critical thinking and systems thinking to construct a framework for solving wicked problem. Benchmark

literature on political success and failure (Brändström and Kuipers,2003; Dunlop,2017a; 2017b; Howlett *et al.*,2015; Marsh and McConnell,2010; McConnell, 2010a; 2010b; 2017; Peters,2015) in order to identify a range of possible political problems faced by government when confronted with wicked policy problems in foreign policy (national interest).The paper focus then integrates these problems balancing and trading-off numerous imperatives (Althaus, 2008).Despite the systems thinking that had emerged out of the RAND Corporation (Mitch,1960), developed in many respects from Lasswell (1956) and his attempts to encourage a concerted harnessing of policy processes for the greater good, it seemed to Rittel and Webber (1973) that some policy problems were not amenable to being put into clearly defined boxes labelled ‘the problem’, ‘desired outcome’ and ‘optimal solution’, which affirmed the spatial nature of wicked problems in policy formulation. While the original ten conditions by Rittel and Webber (1973) were very close to encapsulating all policy problems (because of the assumption that the process of policy analysis does not accord with scientific reasoning and falsifiability), the literature on wicked problems has to put it crudely- focused on differentiating (spatial) between ‘exceptionally tough’ problems and various others which are much less so. Such finer-grained analyses have played out through arguments that problems are not simply tame or wicked (Heifetz,1994; Head and Alford,2015), there are degrees of wickedness (Koppenjan and Klijn, 2004; Roberts, 2000), and indeed there are super-wicked problems (Lazarus, 2009) where time is running out (arguably climate change) which I used a metaphor called polysingularity.

National interest must be communicated broadly in the areas of governance, communication and coordination, what I called ‘Infrastructure’. Spatial polysingularity framework involves recursive thinking to develop strategies for collaboration better knowledge consultation and use of third parties affirmed by scholars (Head,2008; Roberts,2000) like United Nations for peace treaty, called ‘Stakeholders’ improved knowledge transmission and integration within networks (Webber and Khademian,2008). Contexts specific situations requires finding iterative and adaptive ways of continually reassessing and renegotiating solutions rather than attempting to ‘solve’ problems (Head, 2014); and governance strategies based on new ways of observing and enabling (Termeer *et al.*,2015) what I called ‘Scenarios’, altogether a metaphor - Spatial polysingularity construct. A feature of these and numerous other studies is that ‘politics tends to appear on an ad-hoc basis, usually within studies that have specific concerns and approaches. For example, some focus on the institutions and processes of government. Hoppe (2011) addresses the potential and pitfalls of participative–deliberative democracy in addressing unstructured policy problems with high levels of disagreement, focusing particularly on the capacity and realism of vested interests in the established political order to resist challenges to their ideologies and vision.

Spatial polysingularity is a challenge to quasi-rationalistic ways of working affirmed by Head and Alford (2015) to focus essentially on public administration/management, opportunities and the ways in which addressing wicked problems-with high levels of uncertainty, diversity and disagreement for a consensus solution. Human capital networking is an integral aspect of spatial polysingularity construct affirmed by Ferlie *et al* (2011) ‘on the capacity and potential of policy networks to address wicked problems’. Other scholars address power of political elites (influencers of foreign policy of a nation) and the challenges of decision making, including the management of multiple expectations (Hartmann, 2012), and the influence of political ideology (Durant and Legge,2006). The ‘spatial’ nature of policy decision is the crux to political problem for government in responding to a wicked problem and how to avoid damaging its reputation and standing in opinion polls. The manner and ways in which government addresses wicked problems has the potential to affect government’s political capital. A policy intervention, may, for example, help symbolise compassion, demonstrate

that government is in command of issues, and cultivate the impression that government 'got it right' in terms of policy response (Edelman,1967; 't Hart,1993; Cohen,1999). The uncertainty of wicked problems definition (polysingularity) of political problem for government is 'how to avoid its response compromising' the broader ideological/governance trajectory that it seeks to forge (national interest).

How a government addresses wicked problems has the potential to reinforce and/or detract from government's broader ideological/governance trajectory (Baumgartner and Jones, 2009; Howlett,2009; Cairney,2012). From government's perspective, its response to a wicked problem would ideally allow government to promote its broader governance agenda or ideology. Cuts in welfare benefits to 'get people into work' when added to the political problem of how to protect its reputation, maintain control of the policy agenda and forge ahead with its. McConnell, 2018 affirmed that response to wicked problems may involve an attempt to navigate both the policy and political challenges, looking for synergies and accepting modest levels of policy reform (that may be insufficient to address deep causal factors at the governance/institutional levels) and modest levels of political vulnerability (to reputations, agendas and ideological/governance trajectories). Another mid-way forward is developing collaborative understandings of the problem and negotiating the solution like UN organization during 'global crisis' (Roberts, 2000; Head and Alford, 2015; Termeer *et al.*,2015).

Spatial Poly Singularity – Metaphor

The solving of problems undertaken after an exploration of values of their implications for society are explored for suitable goals are identified. It is an adaptive management that involves feedback loops defined by the problems contexts - specific situation, that it addresses, rather than the disciplines involved incorporating knowledge from those who move knowledge to action. It is highly integrated and multidisciplinary decision value creation framework construct that encapsulate the typology of wicked problems solution development (Table 1):

1. Wicked problems it is difficult to decide, what facts to gather without first discussing values.
2. When you think what to do, think of what not to, do because of the inability of science to exercise mastery over eventual outcomes because of confounding influences of spatial and temporal fluctuations and variability; and
3. Desirable values are arrived at through a negotiated process among stakeholders and scenario development by application of pragmatism (paper 1).

Postmodernity National Interests Expose

America 'interest concept' is often invoked as if it were beyond the conceptual reach of ordinary Americans The confusion, crosscurrents, and cacophony about America's role in the world today is strikingly reminiscent of two earlier experiences in this century: the years after 1918 and those after 1945. The five vital U.S. national interests today, these are to (1) prevent, deter, and reduce the threat of nuclear, biological, and chemical weapons attacks on the United States; (2) prevent the emergence of a hostile hegemon in Europe or Asia; (3) prevent the emergence of a hostile major power on U.S. borders or in control of the seas; (4) prevent the catastrophic collapse of major global systems (trade, financial markets, supplies of energy, and environmental); and (5) ensure the survival of U.S. allies. Developments around the world pose threats to the U.S. interests and present opportunities for advancing Americans' well-being. Because America's resources are limited, U.S. foreign policy must be selective in choosing which issues to address and locates frontiers of possibilities. The proper basis for making such judgments is a lean, hierarchical conception of what U.S. national interests narrative using the framework construct: 1 = Human Capital (H);

2 = Values; 3 = Infrastructure (I); 4 = Scenario (A); 5 = Stakeholders (S). National interest's polysingularity (1,3,4 and 5) and spatial values (2). The maxim of spatial polysingularity theory 'when deciding what to do, one is also deciding what not to do'.

What process do we propose for attempting to think clearly about this difficult issue? Army Chief of Staff George Marshall gave America's wartime strategic planners in 1942: They were to identify the Allies' "basic undertakings"- the essential objectives without which the war would not likely be won. Marshall's maxim said: 'when deciding what to do, one is also deciding what not to do'. The relationship between interests and values is complex and subtle (wicked problems). Henry Kissinger's diplomacy wrestles with this dichotomy for 900 pages without resolution (wicked problem). Kissinger's study emphasizes the competition in twentieth century American foreign policy between Woodrow Wilson's "idealism" and Theodore Roosevelt's "realism." Values and interests are less dichotomous poles apart as a results of warfare ecosystem (frontier of possibilities). The survival and well-being of the United States is not just an interest in contrast to Americans' values, but also a core value essential to all Americans. Spatial polysingularity metaphor provide a framework and process for answering questions about America's national interests the relationship between interests and values in a complex, subtle contexts specific situation of wicked problem in policy definition, execution ad assimilation in geo-politics and affirmed by scholar Lakoff and Johnson (1980) that, 'a metaphor is a phenomenon that is understood or experienced in terms of another, and thereby acquires its features'. Similarly, Americans are not uninterested in human rights in China or Nigeria or indeed in the well-being of other individuals with whom they share the globe (Stakeholders). But the Declaration of Independence and Constitution assert first and foremost Americans' interest in the idea and ideal that America survive and thrive (polysingularity). Freedom for individuals, democratic government, and conditions that secure life, liberty, and opportunities for happiness are both interests and values (warfare ecosystem).

Protecting and advancing America's well-being is thus more challenging than in the eighteenth century; and requires deeper and more sustained engagement beyond America's shores (spatial). But a concept of American national interests that begins with the freedom and prosperity of Americans, and puts Americans' well-being first, reflects the original concept of both values and interests in the American experiment (globalization agenda). A spectrum of American national interests stretches from "vital" interests through "extremely important" and "just important" interests to "less important/secondary" interests. Where vital interests as blue chips, the extremely important as red chips, just important as white chips, and less important as translucent chips. In addition to these interests, we recognize "instrumental: U.S. Military Force Requirements" interests - that is, acquired stakes in instruments that are themselves strictly necessary to protect or advance the interests stated (what I call critical Infrastructure). Such instrumental interest: to promote singular U.S. leadership, military capabilities (including the ability to fight and win regional wars in proliferated environments), credibility (including a reputation for adhering to clear U.S. commitments and for fairness in dealing with other states and individuals), and critical institutions (for example, NATO) called Scenario in the wicked problems construct. The scenarios of national interests come in many forms and flavours. Threats and opportunities are often opposite sides of the same coin. Some are posed by countries or regions (East Asia, Russia, Europe and NATO, The Middle East) of intrinsic geopolitical importance; others arise as global issues (Nuclear Futures U.S. and Worldwide; The Proliferation of Weapons of Mass Destruction (WMD); Terrorism, Transnational Crime, and Drugs; International Trade and Investment; Cyberspace and Information Technology and The Global Environment).

The national interest has been divided into those interests, that states consider core or vital, such as security, and those that relate to the promotion of more secondary interests. Moreover, the notion of national interest has historically been associated with a geopolitical understanding of international relations. Indeed, it has been felt that the pursuit of the national interest is closely linked to geography, the locations where acts unfold (for economic, energy, military or other reasons) and which constitute potential fault lines that have to be carefully watched.¹ While this geographic anchoring remains significant,² it has been balanced in recent times by the changes brought about by the deterritorialization of politics at the national and international level³ a deterritorialization that includes normative factors such as identification with human-rights imperatives, the influence that it has on individual and collective interests and values and their interaction, as well as on policies at home and abroad. Evolution of Us Foreign Policy: Isolationism, Imperialism, Pacifism, United Nations (UN) Cooperation, Containment., Post-Containment Era., Pre-emptive Strike (Bush Doctrine), Pre-emptive Strike (Bush Doctrine), National Renewal and Global Leadership (Obama Doctrine)/National Interests are the fundamental building blocks in any discussion of foreign policy.

A defining feature of the next quarter century in international politics will be the emergence of the 'Chinese juggernaut', the world's largest 'non-status quo power'. In The Economist's apt metaphor, 'divas of such proportions never enter the stage without transforming the scene'. China comes onto the international stage with an identity, a history, and presumptions distinct from those of any other state. The Chinese feel acutely, an era of what they see as 150 years' humiliation and subordination, dating from the 1842 'Treaty of Nanking' - an era that is now coming to an end. They look forward to re-establishing what in their eyes is 'a natural hegemony in Asia' and focus on Infrastructure of security and their national interests "realism" of 'one China Policy'. Just like yesterday when Nixon-Kissinger opening to China, or 1979, when formal ties were established, or 1982, when certain arms sales to Taiwan were balanced with a reaffirmation of the "One China" policy. The un-resisted pandemic from COVID-19 China with change foreign policy and the tools of national interest in 21st century where "realism" and liberalism with merge with a new meaning in foreign policy what I called spatial polysingularity metaphor. Geography mattered more than commerce in spatial thinking as a mechanism of geo-politics of power, security and economy.

Boundary Organization

Dominating the development and application of the technologies of the industrial revolution made Great Britain, and later the United States, super-powers for a period spanning more than a century. As Great Britain learned, however, such dominance can be fleeting, and the consequences of falling behind can be devastating. Thus, continued dominance of the development and application of information technology is not just in the short-run military interests of the United States; it is extremely important to its long-run success as the world's only superpower and the 'anatomy' of grand strategy today. How engagement can change the identification and framing of problems of foreign policy school of thoughts: realist school (Dunne and Schmidt, 2005); behaviourist school (Agreen, 2010); Marxist school of thought (Obajili and Obi,2003); and liberal approach (Burchill, 2005) with the critical engagement use of a boundary organization, which is a bridging institution

¹ Lucien Poirier (1994). *La crise des fondements*, Paris: Economica. For more on the link between national interest and geography, and therefore on geopolitics, refer to John Agnew (1998) *Geopolitics: Re-visioning World Politics*, New York: Routledge.

² Yves Lacoste (2006) *Geopolitique: La longue histoire d'aujourd'hui*, Paris: Larousse.

³ John Gerard Ruggie (1998). *Constructing the World Polity: Essays on International Institutionalization*, London: Routledge, pp. 172–197; David Held, Anthony McGrew, David Goldblatt and Jonathan Perraton (1999) *Global Transformations: Politics, Economics and Culture*, Stanford, Calif.: Stanford University Press, pp. 27–28. For a more philosophical, as well as speculative and radical, understanding of deterritorialization, see Gilles Deleuze and Félix Guattari (1987) *A Thousand Plateaus: Capitalism and Schizophrenia*, Brian Massumi, trans., Minneapolis, Minn.: University of Minnesota Press.

which links suppliers and users of knowledge and recognizes the importance of location-specific contexts (Ruttan *et al.*, 1994) what I called warfare ecosystem participating communities (Otaiku, 2018, page 5). The critical success factors for boundary organization are: first, they must provide incentives to produce boundary objects, such as decisions or products that reflect the input of different perspectives; second, they involve participation from actors across boundaries; third, they have lines of accountability to the various organizations spanned [by the boundary organization] (Guston, 2001; Batie, 2008). Foreign policy can be a “boundary object” but only if a better understanding of physical and socioeconomic conditions is desirable from all parties’ perspectives (boundary organization). What is a desirable future is arrived at through a negotiated process among stakeholders?

Thus, a boundary organization by combining tacit and explicit knowledge can co-create new, transformational knowledge and shared understanding which may be critical to the innovation in the policy process (Conklin, 2006; Guston, 2001; Peterson, 2008). This co-creation process, by allowing participants to critically reflect on each other’s views, enables participants to reflect not only on their own preferences and viewpoints but also on how they might be changed (White, 1994) with each scenario. Scenario work enhances integration across themes and serves as a mechanism for interdisciplinary work that engages stakeholders. With dynamic scenario development, alternative futures are identified (sometimes with forecast models), and then the analysis works backward in time to identify crucial pathways that avoid undesirable outcomes or result in desirable ones (Norton, 2005); identify uncertainties; seek alternative framing of problems; build hybrids (objects such as indicators or maps that contain policy information); and build capacity to link knowledge to action (Miller, 1999).

Rationale

Illuminating how policy formulation decisions are actually made (Jacobs, 2005), identification of which held values are subject to change (Sabatier, 1988) and requires trans-disciplinary, “learning by doing” but with extensive monitoring impacts outcomes that then provides information for adaptive management affirmed by Watzin (2007) with insights and knowledge to action is a large ‘spatial’ challenge affirmed by scholars (Ingram and Bradley, 2006; Jacobs *et al.*, 2005; Stephenson and Shabman, 2007). Achieving and implementing a negotiated consensus on which actions will be undertaken is a complicated process that takes time and resources (Jacob *et al.*, 2005) will require help to ‘frame the problem, determine goals, and implement the desired change based on contexts specific situation’. a wider framework of sources of knowledge to inform policy (Nowotny *et al.*, 2001). Nation interest should be mutual understanding through discourse and are based on the premise that, ‘decision making is an iterative process’ with learning taking place as ‘stakeholder preferences are developed or discovered’ when ‘confronting choices’ (Stephenson and Shabman, 2007) termed polysingularity. Spatial polysingularity an engagement methodology embedding those value judgments by participants in the model that should instead be the appropriate domain of the ‘discourse and collaborative negotiations’ since addressing wicked problems involves improving negotiation processes (Norton, 2005; Sarewitz, 2004) in policy development (Tables 2 and 3). This paper argument is that ‘policies should be viewed as experiments’; basically, they provide “learning by doing” but with extensive monitoring impacts outcomes that, then ‘provides information for adaptive solution’ using framework.

MATERIALS AND METHODOLOGY

Materials

Wicked problems arise when different worldviews collide (Valentine *et al.*, 2017). There is no “one size fits all” solution (Christoffersen *et al.*, 2006; Caffal, 1995). The aim is not to find the truth, but rather to improve the world in which people live using consensus for decision making with

‘pragmatic vigor’(paper 1). The wicked problems are incorrigible, and planners are liable for the consequences of the actions that they generate (Rittel and Webber,1973). Wicked problems require local solutions and bottom-up approach is supported by Ardoin *et al.*, 2015 and adaptive co-management Laws *et al.*,2014. The major method was literature reviews. The problems of formulating the problem and conceiving a solution are identical. Every question asked will depend on the understanding of the problem and its resolution at that time. To anticipate all of the questions, knowledge of all possible solutions is needed in order to anticipate all of the information required for resolution. In order to describe a wicked problem in sufficient detail, an exhaustive inventory of all possible solutions is needed (Rittel and Webber,1973). The full consequences of a solution to a wicked problem cannot be appraised until the waves of repercussions have completely run out, and there is no way to trace all of the waves through all the affected lives ahead of time (Rittel and Webber, 1973). The choice of explanation determines the nature of the problem’s resolution (Tables 1 and 4). Traditionally, scientific solutions to problems are only hypotheses offered for refutation. However, this is not true for a wicked problem.

Methodology

Layne (1997) and Wang (2016) grand strategies was used as the theoretical framework. The policy formation (national interest) is shaped by the flow of three streams: problems, policies and politics (Persson,2014).Policy actors may then push a policy onto the political agenda by bringing together the three streams like United States ‘globalization agenda’ or China ‘One Nation One Belt Corridor’. Policy formation takes the form of a constant process of grasping the problem: initiate learning, draw on (available) research, negotiate what to do and make sense of the problem in relation to a particular context (Persson, 2014). Kingdon’s multiple streams approach and Baumgartner and Jones’s punctuated equilibrium theory (PET) will be used to understand national interest policy formation. Kingdon (2003) explained which policies enter the political agenda, by analysing the interplay between different factors (actors, ideas, institutions and external processes). Policy arena as characterized by complexity and unpredictability and as being in a stage of constant (potential) change (Kingdon,2003). Baumgartner and Jones (1993) were interested in stability and change on the policy agenda. They investigated the interplay between the same factors as Kingdon (actors, ideas, institutions and external processes), though focusing on how the interaction between these factors creates stability, and periods of turbulence and change termed polysingularity.

Baumgartner and Jones (1993) identified a circle of interaction between policy actors, the media and public opinion, which feed into each other requires spatial mechanisms of networking while PET focused on policy subsystems (such as agriculture, housing, education etc) as their unit of analysis what I called participants of the warfare ecosystem (Otaiku,2018 page 5), Tables 2 and 3 respectively. I wish to explore is the national interest formation process of a policy problem at the cross-roads of different policy subsystems (warfare ecosystem) and institutional levels (national, municipal, transnational) to make explicit the insights from public value theory, crucial to ‘the construct’, structure of meaning, resulting from the articulation of different discourses into a relatively unified whole (national interest of foreign policy), Figure 3 affirmed by Torfing (1999). National interest ‘tool’ like the United States globalization agenda (policy formation) actors may articulate new meaning by drawing on and combining other discourses or frames. Execution of United states globalization agenda is constrained by the way meaning is structured and also reported by Bacchi (2008) which includes the responses to it and performativity act by the world communities. Grand strategy is the formation of meaning, which is not only dependent on, but also shapes categories, identities and thereby action, as a mechanism of power (with United States and China as case studies). Howarth (2010) reported ‘every discursive formation involves the exercise of power, as well as certain forms of exclusion, and this means that every discursive structure is

uneven and hierarchal' and asserted that policy problem represents some kind of reduction of reality and use of metaphor. It emphasizes some aspects of the problem and neglects others as a selective mechanism. Hall's (1993) asserted that "politics as social learning pursuit for power" and 'suggests that "powering" and "puzzling" are often intertwined in the formation of public policies' and reinforced by knowledge sociologists (Latour,1987). Progressive learning within the social sciences can only be made in relation to values, fixed and agreed-upon set of criteria in relation to which progress is made called national interest.

The understanding of a policy problem like national interest, which gives it legitimacy as a policy issue are not foremost about accuracy due to ever-increasing information flow and the 'quest for filtering mechanisms for speed-accuracy trade-off' termed polysingularity (Tables 2 and 3). Causalities in perception and discursive theory has upheld the configurative aspect of policy formation, its constitutive power. That, a situation is considered as a problem, and what kind of problem, depends on how it is represented, categorized and the situation is framed. Framework is needed that captures the constructive process, how meaning is attributed to a phenomenon through which things take on 'value' Figure 3. Foreign policy has a constructive power, it forms categorizations and interpretations of people and their acts, and by doing that it imposes identities and behaviours where the empirical case study of the United states and China. Causalities in perception strengthens the influence of our understanding of national interest. The categories and their boundaries are constantly reproduced, as individuals, stakeholders interact to make sense of a complex reality (spatial), Table 4. A frame consists of belief, perception and appreciation (Schön and Rein, 1994) that structure information and direct the interpretations of a situation. A frame is often organized around concepts and metaphors and summarizes complex narratives (Hajer,2006). However, the way we measure a phenomenon also constrains our understanding of it and thereby also delimits the prescriptions considered relevant. Complex policy issues can be informed, but not resolved, by 'facts' (Schön and Rein,1994) and at best directed by plausibility, rather than accuracy (Weick,1995). From a constructivist perspective a problem is not discovered, but invented (Lee,2007) or socially constructed (Weick,1995). That a situation is considered as a problem, and what kind of problem, depends on how it is represented: how it is categorized and how the situation is framed (Stone, 1997; Bacchi, 2008), Figure 3, Tables 2, 3 and 4 respectively.

The methodology is critical engagement of location specific contexts (boundary organization) and application of post-normal science that addresses uncertainties (Funtowicz and Ravetz,1993; Nowotny *et al.*,2001) like sustainability science, that seeks to inform and facilitate a societal transition toward sustainable development (Clark,2007) using dynamic scenario development. Scenario development find alternative futures identified (sometimes with forecast models), and then the analysis works backward in time to identify crucial pathways that avoid undesirable outcomes or result in desirable ones (Jacobs *et al.*,2005), Figure 3. What is a desirable future is arrived at through a negotiated process among stakeholders? Scenario work enhances integration across themes and serves as a mechanism for interdisciplinary work that engages stakeholders. Therefore, sustainability science is a good example to illustrate how science can address wicked problems in a policy context like foreign policy (national interest). Addressing wicked problems in a policy context requires both use-driven science that recognizes and addresses uncertainties and meaningful engagement of stakeholders in decision making that propels knowledge into action. While science can offer new ways of thinking or catalyse new technologies, only changes in policies and management lead to action (Ingram and Bradley,2006).

National Interests and Public Values Theory (PVT)

Each nation has its own narrative that calls attention to the particular values they want to be sure to protect or advance called warfare ecosystem as a function of their foreign policy (Tables 1 and 4). This consisting of firstly economic interests and protecting the welfare state; secondly, sociocultural issues focusing on community identity; and thirdly security interests, affirmed by scholars (Geuijen, 2004; Moore, 2013) that, public value offers guidance about how to construct a 'public value account' for understanding an issue like national interest. Moore (2013) describes the distinction between two broadly different philosophical traditions in ethical and political theory: (1) a utilitarian or consequentialist idea in which the value of particular actions is judged in terms of whether it improves the welfare (roughly, the satisfaction or material well-being) of particular individuals; and (2) a deontological or principled idea in which the value of particular actions is judged in terms of whether they are consistent with ideas about justice, fairness, and right relationships in the society. Tables 2 and 3 capture these narratives and shows the different kinds of philosophical/political values at stake in public issues, and how they might register in the individual and collective life of a society. Moore (2013) distinguishes between value judgements made by individuals affected in some way by a given policy, and value judgments at the social or collective level - not only how individuals were treated, but also the degree to which aggregate social outcomes were achieved. The critical issue in PVT is the degree to which a [n]ation can imagine actions that could reliably improve social conditions along each of these key dimensions of value. Equally important is the fact that the different political discourses call attention to only subsets of these values like energy security (hydrocarbon) for United States. The discourse coalition on national interest emphasizes the values of protecting security, minimizing financial costs to government, and protection of social solidarity. Economic theory tells us that decision makers only face a trade-off among values when they have reached what economists call 'the production possibility frontier.' That frontier is a 'theoretical construct' which defines the outer limits of the 'values' society seeks to achieve with an existing stock of resources, and existing methods of production, known as economic interests of a nation and the ultimate of a nation 'grand strategy' focus of paper 1.

The development of foreign policy where national interest's dimensions of value of PVT (Table 2) embrace making a value judgment about the importance of one dimension of value relative to another in the development of grand strategy will requires a critical engagement is the use of a boundary organization component of spatial polysingularity framework; where, foreign policy is defined as wicked problems (Tables 1 and 4). One approach to critical engagement is the use of a boundary organization (Industry 4.0, World Trade Organization), which is a bridging institution which links suppliers and users of knowledge and recognizes the importance of location-specific contexts (Ruttan *et al.*, 1994). As defined by Ingram and Bradley (2006): "boundary organizations are situated between different social and organizational worlds, such as science and policy. Boundary organizations succeed when three conditions are met reported by Guston (2001): first, they must provide incentives to produce boundary objects (Table 2), such as decisions or products that reflect the input of different perspectives; second, they involve participation from actors across boundaries (Table 3) and third, they have lines of accountability to the various organizations spanned [by the boundary organization]. Adaptive and inclusive management practices are essential to the functioning of boundary organizations, Figure 4 by combining tacit and explicit knowledge can co-create new, transformational knowledge and shared understanding which may be critical to the innovation in the policy process (Conklin, 2006; Guston, 2001; Peterson, 2008). This co-creation process, by allowing participants to critically reflect on each other's views, enables participants to reflect not only on their own preferences and viewpoints but also on how they might be changed (White, 1994); identify uncertainties; seek alternative framing of problems; build hybrids (objects such as indicators or maps that contain both science and policy information); and build capacity to link knowledge to action

(Miller,1999); conflict management using scenario development, Figure 3. Geuijen *et al.*,2017 affirmed that, the challenge for rational and democratic policymaking and action taking is partly to keep all of PVT dimensions in perspectives in a given problem and its solution, and resist the temptation to shrink the value dimensions of the problem into the small subset that is one faction's particular preoccupation. It is important for those considering or making policy and action to remain alive to all the dimensions of value that could claim their moral commitment (Table 3). Hardly anybody discards one of those completely, at least not when reminded of their potential importance (Geuijen,2004) of the nature of foreign policy as wicked problems.

Foreign Policy

The Realist School - The emergence of realism is to criticize idealists who "focused much of their attention on understanding the cause of war so as to find a remedy for its existence" (Dunne and Schmidt,2005). Realism is therefore central to international politics both theoretically and practically. Dunne and Schmidt (2005) note, "[f]rom 1939 to the present, leading theorists and policy makers have continued to view the world through realist lenses". Morgenthau (1989) affirmed that, the "objectives of foreign policy must be defined in terms of national interest, and should be supported with adequate power" as the case may be. What this means is that, this tradition considers the 'core interests of the nation as relatively permanent' because it has to do with the protection of the physical and cultural identities of the nation against encroachment by other nations. However, realism is contended by other theories such as liberalism, constructivism, and the English School. To some extent, the practice of international politics today is still in accordance with the principles of realism. State actors, power competition, self-help strategy, national interest, the world disorder, and the balance of power remain important aspects in international politics.

There is a consensus among realists with regard to the three core elements of realism: statism, survival, and self-help (Dunne and Schmidt, 2005). There is also a similarity among them in viewing foreign policy and national interest (Goldstein and Pevehouse, 2008). Realists agree that foreign policy is only to serve national interest in the realm of international politics. Realists see foreign policy and national interest in terms of the struggle for power and the survival of state (Jackson and Sørensen, 2003). This is, why states have to 'pursue the balance of power' in order to preclude the domination of other states. The balance of power can only be achieved through a bipolar world system like the era of the Cold War (Sutch and Elias, 2007). Realists argue that states are always involved in power competition as a result of the will to survive and dominate other countries. Thus, the most important thing for states is 'power'. International politics is about power, and every state struggles to gain power (Morgenthau, 2006). Power can be defined in terms of economic, military, and cultural power; they will change over time (Burchill, 2005) termed polysingularity (uncertainty in the dynamics of objectives).

Behaviourist School - The concept of national interest as a constantly changing "pluralistic set of subjective preferences" (Agreen, 2010). These preferences, according to them, change whenever the requirements and aspirations of the citizen's change.

Marxist School of Thought - The class theorists argue that defining national interest in terms of power, implies accepting the principles that, 'might is right'. It is an indirect way of giving legitimacy to the doctrine that the mighty has a right to rule the world - a rationalization of the domination of the world by states that are militarily powerful. It is a form of justification of the continued exploitation of the weaker states by the stronger ones. Therefore, power theories based on the realist notion of national interest should be rejected by all militarily weak states (Obajili and Obi, 2003).

Table 2. The production possibility frontier for warfare ecosystem for national interest.

N/S	Warfare ecosystem participants/communities	Responsibility and value drivers	Arbiter of Value	Object of Value
1	Institutions	World class education and human capital development	B and C	E and G
2	University research and development	Prototype, proof of concept and spinoff companies	B and C	G, H, J and K
3	Military infrastructure	Space-based assets and GPS guided munitions	C	E, F, G, J, M, N and K
4	The innovators	Inventors, application development and futurist	A, B and C	E,F,G, H, J, K, I N and K
5	Empire builders	Venture capital	A and B	E, ,G , H, I, K, L and N
6	Bankrollers	Capitalist/Finance	B and C	E, G, H, L, K, L and N
7	Architects/Intelligent cities	Clusters/knowledge parks	A, B and C	E, F, G, H, I, J ,K, L, M and N
8	Knowledgepreneur/ Technocrats	Disruptive technologies and indigenous knowledge	A, B and C	E, F, G, H, I, J ,K, L, M and N
9	Energy	Renewable/Non-renewable	A, B and C	E, F, G, H, I, J , K, L, M and N
10	Non-government agencies/media	Improving the state of the world	A and B	E, I, G, J, L, M and N
11	WIPO (Intellectual Property)	Idea, patents, finance, clusters, market and innovation-ecosystems link	A, B and C	E, F, G, H, I, J ,K, L, M and N
12	Diaspora brain drain globally	Distributed networks, data repositories and mining	A , B and B	E, F, G, H, I, J ,K, L, M and N
12	Governance	Policies	C	E, F, G, J, K , L M and N
14	Communities of practice	Business schools, job creation and standards	A, B and C	E, F, G, H, I, J ,K, L, M and N
15	Industrialist	Manufacturing	A, B and C	E, F, G, H, I, J ,K, L, M and N
16	Environment sustainability	Access to necessities. Vulnerability to shocks. Social cohesion	A, B and C	E, F, G, H, I, J ,K, L, M and N
17	Social sustainability	Environmental policy. Use of renewable resources,	A, B and C	E, F, G, H, I, J ,K, L, M and N
		Degradation of the environment		
CODE Meaning				
A =	Individual arbiters of value	H = Private collective arbiters of value		
B =	Private collective arbiters of value	I = Material well-being of group		
C =	Public arbiters of value	J = Public arbiters of value		
D =	Own material well being	K = Economic development		
E =	Well-being of others	L = Satisfy needs of others		
F =	Moral and legal duties to others	M = Vindicate rights Impose duties		
G =	Ideas of a good and just society	N = Achieve a good and Just society		

Source: Adapted from Geuijen *et al.*, 2017

Table 3. Criteria for evaluating public value creation.

		Level of evaluation	The Good (Utilitarian)	The fair and just ((Deontological)
N/S	PVT Dimensions of value	Evaluated at individual level of experience (A)		
		Evaluated at collective level of experience (B)		
1	Institutions	B	Achievement of desired social outcomes	Towards more just social relationships
2	University research and development	A	Client satisfaction	Fair treatment Individual rights vindicated
		B	Achievement of desired social outcomes	Towards more just social relationships
3	Military infrastructure	B	Achievement of desired social outcomes	Towards more just social relationships
4	The innovators	A	Client satisfaction	Fair treatment Individual rights vindicated
5	Empire builders	A	Client satisfaction	Fair treatment Individual rights vindicated
6	Bankrollers	A	Client satisfaction	Fair treatment Individual rights vindicated
7	Architects/Intelligent cities	A	Client satisfaction	Fair treatment Individual rights vindicated
		B	Achievement of desired social outcomes	Towards more just social relationships
8	Knowledgepreneur/ Technocrats	A	Client satisfaction	Fair treatment Individual rights vindicated
9	Energy	A	Client satisfaction	Fair treatment Individual rights vindicated
		B	Achievement of desired social outcomes	Towards more just social relationships
10	Non-government agencies/media	B	Achievement of desired social outcomes	Towards more just social relationships
11	WIPO (Intellectual Property)	A	Client satisfaction	Fair treatment Individual rights vindicated
		B	Achievement of desired social outcomes	Towards more just social relationships
12	Diaspora brain drain globally	A	Client satisfaction	Fair treatment Individual rights vindicated
12	Governance	B	Achievement of desired social outcomes	Towards more just social relationships
14	Communities of practice	B	Achievement of desired social outcomes	Towards more just social relationships
15	Industrialist	B	Achievement of desired social outcomes	Towards more just social relationships
16	Environment sustainability	B	Achievement of desired social outcomes	Towards more just social relationships
17	Social sustainability	B	Achievement of desired social outcomes	Towards more just social relationships

Source: Adapted from Geuijen *et al.*, 2017

Table 4. Spatial Polysingularity Framework Construct for Tame and Wicked Problems.

N/S	Characteristic	Tame Problem	Wicked Problem	Freamework
1	The problem	The clear definition of the problem also unveils the solution	No agreement exists about what the problem is. Each attempt to create a solution changes the problem	National Interest
		The outcome is true of false, successful or unsuccessful	The solution is not true or false—the end is assessed as “better” or “worse” or “good enough”	Stakeholders (S)
2	The role of stakeholders	The problem does not change over time.	The problem changes over time.	
		The causes of a problem are determined primarily by experts using scientific data.	Many stakeholders are likely to have differing ideas about what the “real” problem is and what its causes are	
3	The “stopping rule”	The task is completed when the problem is solved	The end is accompanied by stakeholders ,political forces, and resource availability. There is no definitive solution.	Grand Strategy
4	Nature of the problem	Scientific based protocols guide the choice of solution(s).	Solution(s) to problem is (are) based on “judgments” of multiple stakeholders.	Collaboration
		The problem is associated with low uncertainty as to system components and outcomes	The problem is associated with high uncertainty as to system components and outcomes.	
		There are shared values as to the desirability of the outcomes	There are not shared values with respect to societal goals.	Value
5	Arbiter of value	Object of value	Object of value	
6	Local, National & Global	Nornaal science	Post-normal science	Spatial Polysingularity

Source: Adapted from Geuijen *et al.*, 2017

The use of the concept national interest, in the way as defined by the realists and behaviourists, has the effect of blurring or obliterating the differences between the external behaviours of states with divergent class characteristics. Thus, the differences in the behaviour of capitalist and socialist states, industrialized and undeveloped economies, democratic and authoritarian regimes are masked by the theory that each category of states, or each state, is guided by its national interest (Mamadu, 2006)

Liberal Approach - National interest focus on the pursuit of peace, a harmony between nations (Burchill, 2005). Liberalism rejects realism that views international politics in the lens of conflict, suspicion and competition between sovereign states. “[W]ar is therefore both unnatural and irrational, an artificial contrivance and not a product of some peculiarity of human nature”, and therefore they “have a belief in progress and the perfectibility of the human condition” (Burchill, 2005). In the view of liberalism, “[w]ars provided governments with excuse to raise taxes, expand their bureaucratic apparatus; thus, increase their control over their citizens” (Burchill,2005). Liberal scholars have great faith in human reason and they are convinced that rational principles can be applied to international affairs (Jackson and Sørensen,2003). According to liberal scholars, the prospect for co-operation, even in an anarchical world, are greater than neo-realists would have us believe (Burchill,2005).

To treat the disease of war, liberalism prescribe “the twin medicines of democracy and free trade” (Burchill, 2005, original emphasis). Liberalism argues that “[d]emocratic processes and institutions would break the power of the ruling elites, and curb their propensity for violence” (Burchill, 2005). Liberals believe that the spread of democracy across the globe is required to pacify international politics (Burchill,2005). Economic globalization refers to economic activities across the globe which leads to the interconnectedness and interdependence among countries (Steger, 2003; Yeung, 2002,). Jackson and Sørensen (2003) argue that “[t]rue economic globalisation involves a qualitative shift towards a world economy that is no longer based on ‘autonomous national economies’; rather, it is based on a consolidated global marketplace for production, distribution, and consumption”. Scholte (2001), affirmed that, there are three contrasting ways in economic globalization: the crossing of borders, the opening of borders, and the transcendence of borders. Globalization is seen as a synonymous with internationalization “as part of the long term evolution towards a global society”; the progressive removal of official restrictions on transfer of resources between countries (Scholte,2001). Globalization pressures nation-states to open cross-border activities which resulted in nation-states are no longer able to control on their own - such as global economic transactions and environmental problems (Jackson and Sørensen.2003). Kant provided a philosophical justification for the democratic peace theory. Kant “posited that a republican form of government, exemplifying the rule of law, provides a feasible basis for states to overcome structural anarchy and to secure peaceful relations among themselves” (Chan,1997). The arguments of liberalism above show that foreign policy is not merely dealing with conflict and war as realism argues, but also dealing with cooperation and peace.

Global Humanism Approach

World trade organization and affiliates work together to pursue global values and interests regardless of the differences of vested interests. Gurtov (2007) the “[global] events of the 1980s and 1990s have one thing in common: they reflect the increasingly complex and transnational character of world politics”. As a consequence, it is “difficult to escape the influence of the broader international arena” (Hocking and Smith,1995). Global communities believe that “we live in a global risk which has to confront trans-boundary dangers” and it is “often beyond the control of a single state or a group of states” (Doods,2000). Global humanism tries to offer an alternative view to explain international politics beyond realist approach. In the view of global humanism, the global agenda today has become “larger, more diverse, and more ominous” and therefore it requires “additional tools to analyze it” which is based on an interdisciplinary approach (Gurtov,2007). Realist approach is not adequate to explain the complexity of the world since “the framework of competing national interest cannot cope with planed-wide problems” (Gurtov,2007). In contrast to realism, “global humanism openly acknowledges the principal values and norms that determine its orientation” such as peace, social and economic justice, political justice, ecological balance, and human governance (Gurtov,2007).

The environmental issue cannot be left to states alone since states tend to consider their national interest rather than global interest. Global environmental issues are dealing with international security. DeSombre (2002) argues that global environmental issues “have changed the way we think about what constitutes security”. Global communities have recently recognized that global environmental issues are dealing with international security since most environmental issues crossing the borders and impinging on other states. Unless global communities are able to cope with global environmental issues, they probably will become a new type of global conflicts, especially if it deals with the scarcity of resources. The efforts by global communities to tackle global environmental issues are intended to avoid global conflict. But they need to have a global cooperation to cope with and share the roles with non-state actors such as supranational organizations (e.g. the European Union), international organizations, transnational corporations,

international financial institutions, NGOs, social movements, women groups, consumer groups, and scientists (Greene,2005), Tables 2 and 3 respectively.

Analytics of for 'New' National Interest Construct

Of the schools of thought 'National Interest Theory' explained above, realist no aptly explains the central issue in this paper in the pursuit of 'wicked problem nature of national interests' globally. The realist scholars view that 'the survival and preservation of a state are the primary objectives for going into international relations. 'The realist view on foreign policy is therefore not adequate to explain the global phenomenon of economy and democracy as the ingredients for global peace. Realist approach is not adequate to explain the complexity of the world since "the framework of competing national interest cannot cope with planed-wide problems" (Gurtov,2007), Tables 2 and 3. Global humanism approach "global humanism openly acknowledges the principal values and norms that determine its orientation" such as peace, social and economic justice, political justice, ecological balance, and human governance (Gurtov,2007). Globalization pressures Nation-states to open cross-border activities which resulted in nation-states are no longer able to control on their own, such as global economic transactions and environmental problems (Jackson and Sørensen,2003).Liberalism (Burchill,2005); Marxist school scholar (Obajili and Obi,2003); Behaviourist school theorist (Agreen,2010) all confirmed that, national interests change whenever the requirements and aspirations of the citizen's change, that is, driven by uncertainty in the dynamics of objectives term polysingularity.

The aforesaid definitions of national interest theories create a dichotomy in definition, implications on policy and deficits in ideology to the modernity of human philosophy of development and sustainability of the earth, trajectory space and the globe. Therefore, conceptual discourse of national interests for 21st century need a paradigm shift and to solve the foreign policy 'strategic pause' and change in defence strategy from short view to long term view for the 'anticipatory warfare' of conflicts in 21st century (Otaiku,2018) - it is called the 'War Ecosystem School' because everything potentially impacts everything else, because 'everything's matters, where national interest is a channel to the formulation of foreign policy that 'encapsulate' doctrine defence strategy(Figure 1). It is a philosophy of 'grand strategy' thought where 'methodology thrives in change and evolutions framework for understanding statecraft solutions encapsulated in adaptation to threats with values streams for national interest' (Tables 2 and 3). Interests exist independently of specific opportunities and threats. Developments that pose little direct threat to interests in the short run can grow to become major threats to national interests in the long run like hybrid warfare (Otaiku,2018). Consider, for example, US relations with China. If China becomes a major strategic adversary of the US over the longer run, this could undermine Americans' well-being as surely as a collapse of energy supplies from the Persian Gulf. How much? Surely, AIDS in Africa, or pandemics (COVID -19), or virulent nationalism could mutate and spread to an extent that threatens vital US interests. We ask: in what way, with what probability, and over what time line? National interests are distinct from policies to protect or advance these interests.

War Ecosystem School

Reality imposes the necessity for choice. The national interest construct illuminates 'the pursue political aims using the lens of geopolitics for [d]emocratic processes as an integral of instruments of power for globalization of framework of values and strategic pause, foreign policy, survival, wellbeing of the state, space harmony and a better world'. The 'adaptive theatre of war construct at war and peace time for war ecosystem' (Otaiku, 2018 page 5) was a metaphor to understand the mechanisms of power in national interest dynamic globally. The premise like the Russian "Gerasimov doctrine" describes modern warfare as joint operations utilising a mix of military and

non-military means to achieve political goals and taking full advantage of the intentionally blurred line between 'war and peace'. Modern warfare is 'spatial' powered by "information supremacy," like "the War Between the Wars" Hezbollah / Israel war. The utilization of the framework allows the stakeholder groups to have a shared understanding of what will constitute future military capability. The British Defence Doctrine Joint Warfare Publication (JWP): doctrine is not a set of rules, which can be applied without thought; it is, rather, 'a framework for understanding the nature of armed conflict and the use of force Its purpose is to guide, explain and educate, and to provide the basis for further study and informed debate.'⁴ War ecosystem school accentuate strategy as 'ends' 'means' "ways" as an integral of costs /risks in the valuation of interest of human pursuits in the 'continuum' for dominion, power and harmony in the geosphere whereby exercising the use of instruments of power for sustainability balance of geopolitics and development encapsulated as 'national interest' (Figures 1 and 3 respectively). Take the Russia and United States experience. Failure to apply these unique advantages wisely to shape a twenty-first-century international system in which America or Russia cannot only survive, but thrive would be in Napoleon's phrase: "worse than a crime, a blunder." The Russia and United States cannot do everything, everywhere, at the same time. Strategy is the continuous process of matching ends, ways, and means to accomplish desired goals within acceptable levels of risk (choice). Strategy originates in policy and addresses broad objectives, along with the designs and plans for achieving them⁵.

Institutions and Actors

National security strategists often look to selected government institutions and actors, such as the Department of State or Defense, to achieve objectives and produce outcomes that are tied to a strategy's political aim. Depending on the situation, however, other institutions and actors may be appropriate. The accompanying list illustrates a range of public, private, domestic, international, and other organizations and actors that may contribute to a strategy's success through formal, semi-formal, or informal relationships (Tables 2 and 3).

The Instruments of Power (DIME). Actors and institutions pursue objectives by wielding four primary instruments diplomatic, informational, military and economic (DIME) to project power; each instrument comprises a set of fundamental capabilities, which are noted in the accompanying, Figure 3. The strategists' challenge is to determine what combination of those capabilities best suited to deal with the situation (scenario) at hand; this effort requires understanding the utility of each instrument: what are its capabilities and limitations given a particular situation, what are the best concepts and methods for how to use it, and what are its costs and risks. Strategies designed to respond to specific security challenges frequently require considering how to implement them within the bounds of existing means (Table 3). 5G will be significant network gaps to enabling Industry 4.0 not only in providing connectivity for the billions of internet of Things devices, but also in transferring and processing the huge volumes of data that will be generated in the 21st century connected society as a metaphor for spatial polysingularity construct.*

Global Operating Model. The Global Operating Model describes how the Joint Force will be postured and employed to achieve its competition and wartime missions (Figure 3). Foundational capabilities include: nuclear; cyber; space; C4ISR; strategic mobility, and counter Weapon of Mass Destruction proliferation. It comprises four layers: contact, blunt, surge, and homeland.

⁴ Hoffman F. G (2009). Hybrid warfare and challenges. Small Wars Journals 52: 34-39.

⁵. Graham T. Allison and Robert Blackwill. © Copyright 2000 The Commission on America's National Interests.

* Unlocking Industry 4.0: Understanding IoT In: The Age of 5G <https://www.forbes.com/sites/tmobile/2020/08/06/unlocking-industry-40-understanding-iot>.

These are, respectively, designed to help us compete more effectively below the level of armed conflict; delay, degrade, or deny adversary aggression; surge war-winning forces and manage conflict escalation; and defend the U.S. homeland⁵. **Threats.** Fundamentally, a situation is threatening only if it endangers some aspect of a national interest. Strategies should serve as a point of departure when assessing any strategic situation. As with interests, prioritizing threats based on analysis of which are most dangerous or most likely? This prioritization helps keep the strategy focused on what is most important, development of a scheme for assessing the seriousness of threats is necessary in combination with assessments of the value of the interest, this can provide important additional insight about the most appropriate strategic approach to dealing with the challenge (Table 2). A significant threat to a vital national interest will call for a different response than a negligible threat to a peripheral national interest. Threats pose perceivable harm to a state's interests (Table 3). The following abstract formula may be useful in assessing threats: Threat = Capability (theirs) x Will (theirs) x Vulnerability (ours). Conceptually, the higher the values, the greater the threat.⁶

National Security Strategy

When we talk about the strategy a country employs in pursuit of its interests, we usually use terms as National Strategy, National Security Strategy, or Grand Strategy. National security strategy bridges the gap from the current state of affairs or condition to the desired state of affairs or condition, articulated via the "political aim." It is an iterative process, which begins with assessing a security situation that affects national interests that defines achievable, desirable "ends" that will preserve, protect or advance national interests (Figure 1). It also pivotal in the creation of subsidiary strategies and plans to resolve specific security challenges. Those ends entail both the political aim, or the desired condition the strategy intends to attain, and the specific objectives that must be accomplished to achieve the political aim. What specific objectives, if achieved, will support the political aim, and also what "ways" (how to achieve the political aim) and "means" (tools, resources, and/or capabilities) will be required to enact the strategy.

The term "ways" may be construed broadly to refer to the fundamental strategic approach to be employed or, more narrowly, to how the selected means will be used to achieve the political aim iteratively and objectively assess its viability. National security strategy (NSS) could begin with procedure or approach by strategists in the United States Defense Department Reorganization Act put in place a more deliberate, structured, and formalized approach to developing an overarching national security strategy. The Act directs the President to submit an annual report on the national security strategy of the United States to Congress, detailing the country's vital worldwide national security interests, goals, and objectives; and outline the proposed short- and long-term uses of national power. President Ronald Reagan submitted the first of these reports, titled National Security Strategy of the United States in 1987.⁷ It suggests that if strategy consists of objectives, concepts, and resources each should be appropriate to the level of strategy and consistent with one another. Thus [military] strategy at the national level should articulate military objectives at the national level and express the concepts and resources in terms appropriate to the national level for the specified objective.⁸

⁶ The National Security Strategy of the United States of America. Washington, DC: The White House, December 1999.

⁷ The White House released the most recent National Security Strategy of the United States on December 18th, 2017. All 17 National Security Strategies of the United States are archived at <http://nssarchive.us/>.

⁸ Harry R. Yarger, "Towards A Theory of Strategy: Art Lykke and the Army War College Strategy Model," in U.S. Army War College Guide to National Security Issues, Volume I: Theory of War and Strategy, 3d ed. (Carlisle, PA: U.S. Army War College, 2008), p. 45.

The Cold War provides a metaphor strategy framework to analyse a country's grand strategy. The overarching strategy of containment served as the guiding framework for subsidiary strategies aimed at addressing specific regional and functional security challenges like the Marshall Plan for the reconstruction of Europe, the American wars in Korea and Vietnam, and the U.S. space program were guided by the overarching containment strategy. The Clinton administration, 1994 promulgated a NSS of Engagement and Enlargement to enhance security by maintaining a strong defense capability and promoting cooperative security measures; open foreign markets and spur global economic growth; and promote democracy abroad. The grand strategy was supplemented by regional and functional strategies throughout the two Clinton administrations. Those strategies dealt with specific security challenges such as the expansion of The North Atlantic Treaty Organization (NATO), the enactment of NAFTA (North American Free Trade Agreement) and intervention in the Third Balkan War of 1991-2001.⁹ Thinking strategically entails applying the five following fundamental elements of strategic logic (Figure 2) national interest operates in an atmosphere of widespread uncertainty and ambiguity:

- i. Analysing the strategic SITUATION (the challenge and its context), Figure 1;
- ii. Defining the desired ENDS (the outcomes sought), to include first defining the overarching political aim, and then the specific objectives required to achieve it;
- iii. Identifying and/or developing the MEANS (resources and capabilities) to be executed;
- iv. Designing the WAYS to use the means to achieve the desired ends; and
- v. Assessing the COSTS/RISKS associated with the strategy.



Figure 1 | Strategy Formulation.¹¹



Figure 2 | Fundamental elements of strategic logic.¹²

In developing strategies, unknown factors often outnumber those that are known by Carl von Clausewitz, 'If the mind is to emerge unscathed from this relentless struggle with the unforeseen, two qualities are indispensable: first, an intellect that, even in the darkest hour, retains some glimmerings of the inner light which leads to truth; and second, the courage to follow this faint light wherever it may lead.'¹⁰ Clausewitz was writing about the unforeseeable future, but even the present is not fully knowable.¹⁰ These could be assumptions about specific but unknown facts (truths), about cause and effect, about the influence of time on the challenge at hand, and about the consequences of inaction or about certain courses of action.

⁹ The 17 National Security Strategies of the United States are accessible at <http://nssarchive.us>. The site also includes links to subordinate strategies (i.e., the National Defense Strategy and National Military Strategy). The site is maintained by the Taylor Group, a national security consulting firm unaffiliated with the U.S. Government or any foreign government.

¹⁰ Von Clausewitz, Carl, *On War* (Princeton University Press, Princeton, New Jersey, 1976) p. 102.

While listing the elements of strategic logic makes that logic appear linear, developing strategy actually is a much more complex, multi-dimensional, iterative, and often imprecise process. One useful way to visualize the interrelationships of the elements of strategic logic is shown in the accompanying diagram, Figure 2.¹² It depicts the strategic situation as a cloud, because like a cloud, it is amorphous, ever-shifting, and considerably opaque. Comprising that cloud are considerations such as the problem's parameters, international and domestic conditions that bear on the problem, one's national interests and political aims, threats to those interests and aims (or opportunities for advancing them), constraints on one's freedom of action, the most critical assumptions about the dynamics of the problem confronted, and any other factors important to the strategic situation that surrounds the problem being addressed. It is essential to maintain intellectual agility while applying the steps of strategic logic, Figure 1.¹¹ The ends are the political aim(s) sought and their specific objectives, the means are the resources, power and capabilities available or able to be developed, and the ways are how means will be used to achieve the ends. Costs are the price one has to pay financially and otherwise to execute defence strategy, and risks are developments that could go wrong and work to one's disadvantage.

The Figure 2 diagram portrays the ends-ways- means-costs/risks as circular rather than linear. The circular relationship stresses the need to consider each element in relation to all the others. The circular relationship indicates that there is no end to the process; continually go back and iteratively reassess the strategy across its execution.¹² Apply the strategic logic to The Cold War, the main element of any United States policy toward the Soviet Union must be that of a long-term, patient but firm and vigilant containment of Russian expansive tendencies.¹³ There was both an offensive and defensive component to the strategy.¹¹ The defensive objective was to hold back the political, economic and military influence and physical presence of the USSR. The offensive objective, somewhat overlooked in conventional analyses of United States Cold War policy, was 'the promotion of stable democracies and market economies; healthy market democracies would deprive the Soviets of fertile ground in which to sow the seeds of their revolutionary ideology'. First, we must know, 'what characteristics and factors are generally important in building a grand strategy?'- The prerogative of warfare ecosystem (Otaiku, 2018 page 5). Then we turn to an analysis of the contemporary international security environment in an attempt to identify as precisely as possible the relevant characteristics of that environment. Figure 2¹² provides one methodology for conducting such a strategic¹⁴ assessments. According to the official statements of United States policy, there are certain "fundamental and enduring needs" which our national security strategy must ensure. They are: "protect the lives and safety of Americans, maintain the sovereignty of the United States with its values, institutions and territory intact, and promote the prosperity and well-being of the nation and its people."¹⁵

¹¹ National Security Strategy Primer, National War College faculty, staff and student body "A prudent idea or set of ideas for employing the instruments of national power in a synchronized and integrated fashion to achieve theatre, national, and/or multinational objectives." From: DOD Dictionary of Military and Associated Terms, http://www.dtic.mil/doctrine/new_pubs/dictionary.pdf as of August 2017, p. 220.

¹² National Security Strategy Primer, National War College faculty, staff and student body "A prudent idea or set of ideas for employing the instruments of national power in a synchronized and integrated fashion to achieve theatre, national, and/or multinational objectives." From: DOD Dictionary of Military and Associated Terms, http://www.dtic.mil/doctrine/new_pubs/dictionary.pdf as of August 2017, p. 220.

¹³ George F. Kennan, "The Sources of Soviet Conduct," reprinted in *Foreign Affairs*, Vol. 65, No. 4 (Spring 1987): pp. 852-868. Quote p. 868.

¹⁴ This is the methodology employed by the United States Army War College in its core curriculum of instruction. See also Appendix I for a detailed explanation of the Strategy Formulation Guidelines.

¹⁵ A National Security Strategy for a New Century (Washington, DC: The White House, 1998), p. 5. 14.

National Interest Features As Wicked Problems

Complexities of wicked problems 'national interest' 'with the difficulty for solution emerges from the institutional and political (warfare ecosystem) contexts within which and through which we seek to manage them. Table 1 (boundary organization) is a platform with institutional structures and processes are divided both by sectors, levels and politics is an approach that recognize that effective deliberation, decision, and action is distributed across this whole participants of public value creation by stakeholders rather than narrowly held within one cell. The wicked problems framework (WPF) highlighted the constituent's elements in national interest problems in public foreign policy by framing (Figure 3) the problem for rational analysis and intelligent action.

The narratives are:

1. Value decision in each participant (Tables 1 and 2) in the warfare ecosystem, an example the United States 'globalization agenda' in the foreign affair policy execution. The impacts at organizational level efforts, alter not only what that organization produces, but also what other organizations in the system decide to do, with better or worse effects on performance reported by scholars (Kiser and Ostrom, 1982; Koppenjan and Klijn, 2004). That is, why high levels of 'strategic uncertainty' and 'institutional insecurity' characterize globalization and power inequalities affirmed by (Koppenjan and Klijn, 2004);
2. Grand strategy of any nation foreign policy creates 'institutional void' (Hajer and Wagenaar, 2003) without execution. There are no pre given rules that determine who is responsible, who has authority over whom, what sort of accountability is to be expected. Governance is through networks rather than hierarchies, interest and value (Tables 2 and 3); and
3. The governing capacity lies in more or less formal agreements made among independent organizations that recognize their interdependence and effectively co-ordinate action, Tables 2 and 3 respectively.

National Interest as Public Value

Benington (2011) proposed: public value is, on one hand, what the public values, and, on the other, what adds value to the public. The first part of this definition 'what the public values- focuses on the individually held values of members of the public (we will call such individuals 'citizens'). The second part, 'what adds to the public value seems to imagine a more collectively shared view of a good and just society which is more than a simple aggregation of the individually held views of individual citizens'. Who is to determine what is valuable in a given situation? Moore (2014) illuminate this fundamental tension in 'democratic theory', what he calls the 'social arbiter of value' on one hand from the 'object of valuation' on the other, Tables 1 and 2. Three different arbiters of 'social' or 'public' value are distinguished: individuals; individuals who have voluntarily aligned themselves with other individuals who share their values in what could be described as voluntary collectives; and a 'public' that consists of citizens living in, subject to the law of, and sharing in the governance of a given political jurisdiction. Similarly, four different substantive values are defined as valued conditions in the society (Tables 2 and 3). The first focuses on the material well-being of the valuer: the degree to which they are protected from the hazards of nature through personal income and wealth, food, shelter, healthy environments, health care and so on. The second focuses on the material well-being of others in the society -the altruistic desire to ensure that other individuals have access to the material necessities of life. The third focuses on the desires of individuals and groups to live up to their social duties to one another. The fourth value is what defines the valuer's (whether individual, voluntary collective, or public) ideals of the aggregate characteristics of a good and just society. One could describe these as social or political views which are expressed in both private and public action directed towards bringing about the ideal states (Moore, 2014).

Wicked problems and grand strategy

Wicked problems issues like national interest are by definition multi-level and multi-sectorial at the same time. So we need a more expansive way of thinking about ‘who the public is’ that embraces these other levels, sectors and participants (Table 2). A crucial issue then is: ‘who is the public, and how could it be called into existence and become articulate about the important public values?’ Moore and Fung (2012) suggest that the process by which the public is formed is crucial. The legitimacy of any public value proposition increases when the process surrounding public deliberations is ‘appropriately inclusive, deliberative, imaginative and accurate in predicting the consequences of proposed actions’ where Figure 3 and Table 3 illuminate the national interest construct. Thus, public value theory (PVT) is radically democratic. Taking this as our starting point, then, we need to understand how society acting through a complex social structure can become a ‘public’ that can understand and act on its own interests (Tables 2 and 3), and in doing so, create the legitimacy and support that is required for effective government action. Goodin ,2007; Dahl 1990 [1970] affirmed and suggests involving, and giving voice to ‘all affected interests’, that is, individuals should be able to influence the decisions that affect their interests, both sentimental and material.

Dahl,1990 [1970] posited ‘everyone who is affected by the decisions of a government should have the right to participate in that government.’ Participants should contribute based on the proportion to the degree to which their interests are affected (Goodin,2007), or to how regularly one is affected, or to the importance of the interests involved, or in exactly which way the influence would materialize (from deliberation to deciding on laws) asserted by Fung (2013). Goodin (2007) suggests that, participants interest is the consequence of accepting participation (Tables 2 and 3) Indeed, it saw the idea of citizens as arbiters of public value rather than ‘clients’ or ‘customers’ of government services as fundamental, and a great deal of effort was made to distinguish the two and assign priority in the arbitration of public value to citizens, as they participated in the process of democratic government as opposed to clients (who had particular interests) or even taxpayers (who also had particular interests in government policy decisions). Consequently, it was natural that PVT focused on structures and processes located within democratic states and polities; the particular ‘authorizing environment’ for government action (Moore,2014; Moore and Fung,2012; Benington,2011).

What is valuable in a given situation?

Moore (2014) delineates what he calls the ‘social arbiter of value’ on one hand from the ‘object of valuation’ on the other (Tables 2 and 3). Three different arbiters of ‘social’ or ‘public’ value are distinguished: individuals; individuals who have voluntarily aligned themselves with other individuals who share their values in what could be described as voluntary collectives; and a ‘public’ that consists of citizens living in, subject to the law of, and sharing in the governance of a given political jurisdiction. Firstly, the material well-being of the valuer: the degree to which they are protected from the hazards of nature through personal income and wealth, food, shelter, healthy environments, health care and so on. Secondly, the material well-being of others in the society, the altruistic desire to ensure that other individuals have access to the material necessities of life. Thirdly, the desires of individuals and groups to live up to their social duties to one another. Fourthly, value is what defines the valuer’s (whether individual, voluntary collective, or public) ideals of the aggregate characteristics of a good and just society. The consequence, these as social or political views which are expressed in both private and public action directed towards bringing about the ideal states.

Who is the public and does it affects wicked problems?

PVT is radically democratic. How could it be called into existence and become articulate about the important public values? Moore and Fung (2012) suggest that the process by which the public is

formed is crucial. The legitimacy of any public value proposition increases when the process surrounding public deliberations is 'appropriately inclusive, deliberative, imaginative and accurate in predicting the consequences of proposed actions', Figure 3 and Table 3. To understand how society acting through a complex social structure can become a 'public' that can understand and act on its own interests, and in doing so, create the legitimacy and support that is required for effective government action. Goodin (2007) suggests involving, and giving voice to 'all affected interests', that is, individuals should be able to influence the decisions that affect their interests. National interest construct (warfare ecosystem) allows citizens as arbiters of public value rather than 'clients' or 'customers' of government services as fundamental, and a great deal of effort was made to distinguish the two and assign priority in the arbitration of public value to citizens, as they participated in the process of democratic government as opposed to clients (who had particular interests) or even taxpayers (who also had particular interests in government policy decisions), Tables 2 and 3 as narratives. PVT focused on structures and processes located within democratic states and polities; the particular 'authorizing environment' for government action (Moore 2014; Moore and Fung, 2012; Benington, 2011). Wicked problem like national interest is by definition multi-level and multi-sectorial that need a more expansive way of thinking about who the public is that embraces these other levels and sectors (Figures 1 and 2; Table 3).

WICKED PROBLEMS FRAMEWORK (WPF)

Globalized economy creates all the good things we like, but it also creates these highly complex issues such as climate change, inequality, environmental degradation, terrorism, global financial instability, multi-cultural integration or cyber security termed globalization polysingularity. The defining feature of these issues is that, they are not isolated problems but they are in a sense emergent features of the 'very systems' through which we organize ourselves today (spatial decision making using internet). These wicked problems today require a new skill set and more collaborative networked systems of organization to tackle (Figures 3 and 4). It is interesting to note that, in many ways these wicked problems can be understood to have derived from the standardized set of solutions we developed during the Industrial Age, the combustion of fossil fuels that served us so well for centuries being a classical example. The terms system innovation and systems change have arisen in parallel to the idea of wicked problems as a new language is now entering the public sphere, seeing problems as "interdependent", involving significant levels of "uncertainty" and most of all "complex" termed polysingularity. In the face of a growing recognition to the systemic, interconnected, interdependent and ever-evolving nature of these challenges, termed spatial polysingularity, 'a metaphor for systems-based approach to contexts specific situation quests for answers', Figure 3. Spatial polysingularity is consistent with systems philosophy, systems thinking concerns an understanding of a system by examining the linkages and interactions between the elements that compose the entirety of the system using 'pragmatism' (Paper 1 objective). Values are key in helping us draw boundaries (what's 'in' and what's 'out'?) and wicked problems solution are value-driven and interconnectedness (framework).

The framework is the boundary between included and excluded stakeholders and inter-relationships (how do things connect with each other?). It represents values, and there is a two-way relationship between values and boundaries. The values that you bring into an arena of action will help drawing meaningful boundaries (Tables 2 and 3). Values are not general principles; they are linked to our personal, state, national and global goals. But some boundaries are already given by institutions, states actors and those boundaries constrain the type of values that may be expressed (perspectives, what are the different ways a situation can be understood?). The framework (Figure 3) illuminate national interest as case study narrative are: (1) exploring boundaries, understanding the inclusion, exclusion and marginalisation of stakeholders and the issues that concern them; (2) appreciating

multiple perspectives, how and why stakeholders frame issues in different ways; even whether something is a system or not will depend on a person's particular perspective ;(3)understanding relationships networks of interconnections within and across systems; (4) thinking in terms of systems themselves organised wholes with emergent properties that cannot be theories, nested systems.

Spatial polysingularity approach to wicked problems are: (1) approaches for exploring value and boundary judgements about what should be included in or excluded from analysis, and marginalized as well; (2) approaches for understanding complex causality, feedback, vicious and virtuous circles, and the possible consequences of intervention; (3) approaches for developing viable and highly responsive organizations at multiple levels (global to local); (4) approaches for addressing conflict, exploring multiple perspectives, developing mutual understanding, and agreeing solutions that people are willing to implement (Figure 3 and Table 3). Wicked problems never develop in a vacuum and are thus 'connected not only to other problems, but also to their results'- values (Table 2). Every problem interacts with other problems and is therefore part of a system of interrelated problems.¹⁶ Systemic problems inevitably need systemic approaches. A systemic view allows us to focus on our collective failure, and at the same time, on our collective potential to collaborate effectively.¹⁷ Wicked problems always materialise at the level of societies, beyond the grasp of individual organisations (like environmental issue, spatial by definition), Tables 1 and 4. At this level, different societal actors interact and create problems or are not able (or willing) to come up with solutions like climate change are polysingularity, and similar to taking stock of a problem from various angles is called triangulation.¹⁸ Considering the most important societal dimensions of a problem requires societal triangulation, in which the wickedness of the problem can be related to the behaviour and interests of the most important societal stakeholders that surround the issue.¹⁹ At societal level, identifiable groups of actors become stakeholders, have vested interests, adopt ideologies and create institutions that define the context in which problems become more or less wicked, Table 3.

Pragmatism and Systems Thinking: Spatial polysingularity 'Logic'

Philosophers such as John Dewey and William James found put more emphasis on the process of 'how we know' and understand rather than proving whether a statement is 'true or false'. They understood the acquisition of knowledge to be an exercise and a process that involves interacting with and inquiring about the world rather than an abstract, purely conceptual exercise. This understanding can only be gained through experience. Charles Pierce (as quoted by Martin, 2009) argued that, 'new ideas do not emerge from declarative logic (deductive and inductive logic) since a new idea cannot be proved using past data' - polysingularity. New ideas cannot be, therefore, a product of these two forms of logic (induction and deduction). There must be a third logical mode which he termed '*abductive logic*'. It is a product of logical leaps of the mind that arise when a thinker observes 'data that does not fit with existing model/s'. The thinker, then seeks, to make sense of this observation by inferring to the 'best explanation' (Martin, 2009). By inferring to the best explanation requires 'platform thinking' framework called spatial polysingularity.

¹⁶ Ackoff. Redesigning the Future, p.21. Ackoff, R. L., (1981).

¹⁷ Conklin, Dialogue Mapping, p.37. Conklin, J.E. (2006)

¹⁸ Van Tulder, Partnering Skills.

¹⁹ This approach is a combination of institutional and welfare economics and very often applied in the partnering literature. See Van Tulder with Van der Zwart, International Business-Society Management for a basic elaboration and Waddock and others,

'The complexity of wicked problems' for a more applied elaboration relating to leadership challenges.

System thinking is not one thing but ‘a set of habits or practices’²⁰ within a framework that is based on the belief that, ‘the component parts of a system’ can best be understood in the context of relationships with each other and with other systems, rather than in isolation - spatial. Systems thinking focuses on ‘cyclical’ rather than ‘linear cause and effect’. In science systems, it is argued that, the only way to fully understand why a problem or element occurs and persists is, ‘to understand the parts in relation to the whole.’²¹ Spatial polysingularity can be applied to ‘design thinking’. Systems thinking is being drawn towards a solution based approach (Ackoff,1981). Experiences of interventions that integrate the two (design thinking and systems thinking) have yielded positive results and prove this not only to be a possibility but has brought to light further understanding of factors that determine success. Combining systems thinking and design thinking has the potential of improving on the holistic understanding of the national interest (Figure 3) as stakeholders have the opportunity to view the system from different angles (Table 3). The above narrative affirmed by Kranzberg and Smith (1988) as ‘a systemic thinking and attitude of purposeful creativity with multiple impacts factors like the internet’. The basic idea of the internet of things (IoTs) is that virtually every physical thing in this world can also become a computer that is connected to the Internet (ITU, 2005), Figures 3 and 4; build new and better business processes (Vitzthum and Konsynski,2008) companies like Google (search engine) and shopping (eBay or Amazon).The “network of networks” powered by IoTs has impacts on the total productivity factor and economic development (Solow,1957); and creates national comparative advantages based on human capital and technological infrastructure (Dunning,1993). IoT as a “constellation of inanimate objects by built-in wireless connectivity, to be monitored, controlled and linked over the Internet” (Cha, 2015).

Changes in technology and the resulting changes in the facilitating structure can require adaptations in policy and the policy structure based on Tables 2 and 3 participants of the warfare ecosystem. The abductive reasoning based design thinking (Mugadza, 2015) emphasizes the need to be empathetic and creative to produce and outcome that meets the need (solution based approach), Table 3. The spatial polysingularity construct approach that combines the two (design thinking and systems thinking) should therefore be more holistic, empathetic and innovative and the sums up some of these initiatives and both the theoretical and practical benefits of the integrated approach in dealing with complex problems (Mugadza, 2015).

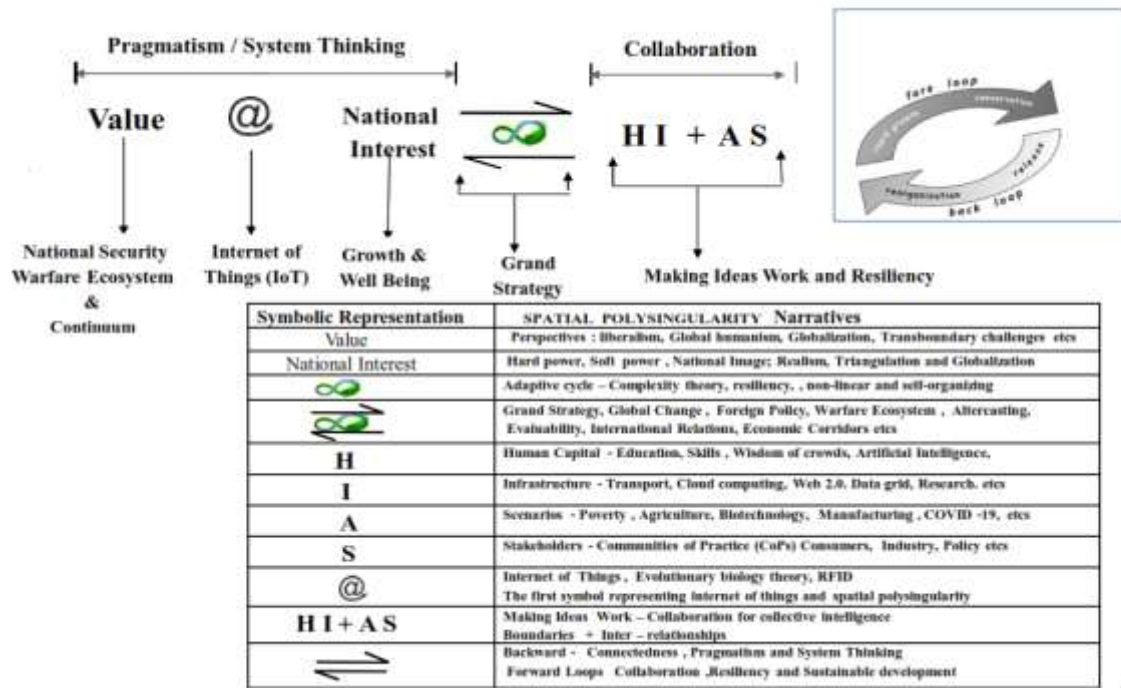
CASE STUDIES AND FRAMEWORK APPLICATION

Human Capital (H) and National Interest: The United States of America

The U.S. economy including its workers is constantly adapting to the forces that shape economic activity. The coronavirus (COVID -19) pandemic has triggered dramatic, deteriorating economic conditions across the globe in 2020 and will requires build the human capacities and development of capabilities integral to local capacities globally with best practices (spatial), Table 3. Using ‘American exceptionalism’ on ‘national interest’ as case study for the wicked problems discourse. The industrial revolution, which further mobilized the labour force (human capital) by creating a demand for labour in industrial centres; developments in transportation that made ocean and land travel easier and cheaper, effectively shortening the distances between the Old and New World (Moya,1999). Such large-scale changes help explain why so many Europeans immigrated to the United States after the 1840s, and why as industrialization spread across the continent - European migrants came mostly from Southern and Eastern Europe by the last quarter of the nineteenth century.

²⁰ <http://www.watersfoundation.org/index.cfm?fuseaction=materials.main>

²¹. ^ Capra, F. (1996) .The web of life: a new scientific understanding of living systems (1st Anchor Books Ed). New York: Anchor Books. p. 30.



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Figure 3 | Wicked Problems Framework (WPF) application to national interest called spatial polysingularity construct.

@ [@ with an arrow] meaning contexts specific situation or problem = Spatial polysingularity symbol



Source: McKinsey & Company, 2013. Consumer impact of the Connected Life.

Figure 4 | Internet of Things (IoT) facilitates connectivity to scope, scale and complexity as a platform to execute Globalization 4.0 wicked problems solution to be contexts specific. In other scenarios, IoT sensor data might need to be collected in real-time from sensors, RFID tags, tracking devices, even mobile phones across a wider area via 5G protocols.

To a certain extent, these factors were also applicable in Japan, which had modernized quickly in the nineteenth century; as well as China, Korea, and the Philippines (Hsu, 2000; Choy, 2003; Azuma, 2005). Thus, after the 1870s, the United States (as well as other countries in the Western hemisphere, particularly Argentina, Brazil, and Cuba) saw sharply increasing migrant populations from southern and eastern Europe and Asia. Apprehensions of illegal border crossers began to fall sharply in 2006, and have continued to decline, falling even more sharply in the early months of 2017 following the inauguration of President Trump (Partlow, 2017).

The National Interests Served by US Immigration and Refugee Policies

Martin (2017) estimated 17 percent of those employed in the agriculture industry lack legal status in United States. Seventy percent of US crop workers not counting those with H-2A visas were born in Mexico and 70 percent of foreign-born crop workers lack immigration status. The steady, decade-long decrease in Mexican immigration to the United States has led to a shortage of immigrants who can supplement and replace the “aging and settling” US farm labour work force (Warren, 2017; Martin, 2017), which may be further diminished by increased immigration enforcement. The World Economic Forum’s 2016 report on global risk found conflict, violence, water crises, climate change, and economic factors to be strongly associated with rising involuntary migration (WEF, 2016). In “Mainstreaming Involuntary Migration in Development Policies,” Harbeson (2016) argues that “state fragility” produces more involuntary migrants than even civil war and conflict.

President Lyndon B. Johnson said, that the Act corrected “a cruel and enduring wrong,” overturned a law that “violated the basic principle of American democracy that values and rewards each man on the basis of his merit,” and removed the “twin barriers of prejudice and privilege” from the immigration system (IMR, 2011). President Trump and “no link whatsoever between greater exposure to trade competition or competition from immigrant workers and support for nationalist policies in America” (Rothwell and Diego-Rosell, 2016). However, Trump attracted higher levels of support from persons in racially and culturally isolated communities, “with worse health outcomes, lower social mobility, less social capital, greater reliance on social security income and less reliance on capital income”. The need to understand and respond to the concerns of these Americans may be a pre-requisite to positive immigration reform (Young, 2017). The success of US immigration policies invariably depends on cooperation from other nations, “whether in responding to the causes of forced migration, promoting the humane treatment of migrants in transit, protecting migrants in destination states, or receiving returning nationals” (Kerwin and Warren, 2017). Between 1990 and 2030, the percent of the foreign-born population between the prime working ages of 18 and 64 is projected to double to 20 percent and it will continue to increase, although at a slower rate, from 2030 to 2050. By contrast, the percentage of the US population age 65 and over is projected to increase from 13 to 20 percent between 2010 and 2030 (Ortman *et al.*, 2014).

The Benefits of Immigration

Martin (2017) explains that farm employers, especially in the western United States, have historically relied heavily on immigrant workers, undocumented (an estimated 17 percent) lack legal status. Immigrant entrepreneurship, although immigrants made up just 13.7 percent of the U.S. population in 2017,²² and they made up almost 30 percent of all new entrepreneurs in the United States that year.²³

²² Migration Policy Institute, “U.S. Immigrant Population and Share over Time, 1850–Present,” available at <https://www.migrationpolicy.org/programs/data-hub/charts/immigrant-population-over-time>

²³ Kauffman, Ewing Marion (2017). The Kauffman Index of Start-up Activity: National Trends (Kansas City, MO: 2017),

Immigrants continue to be nearly twice as likely as native-born people to start businesses.²⁴ Immigrant entrepreneurship help develop tech giants and start-ups such as Amazon, Apple, Google, and Yahoo - which were founded by immigrants or their children and Microsoft and Oracle, which are today led by immigrants. New American Economy report, nearly 44 percent of the companies on the 2018 Fortune 500 list were founded by immigrants or the children of immigrants.²⁵ Together, these companies in fiscal year 2017 brought in \$5.5 trillion in revenue-a figure that is greater than the gross domestic product (GDP) of every country in the world other than the United States and China.²⁶ Small businesses make up nearly 70 percent of all employer firms in the country and that they help to create jobs and power local economies. It is therefore significant that immigrants own more than 1 in 5 small businesses and are more than 20 percent more likely to own such a business than a native-born person.²⁷ Immigrants own more than 60 percent of all gas stations, 58 percent of all dry cleaners, 53 percent of all grocery stores, 45 percent of all nail salons, and 38 percent of all restaurants.²⁸ These are the businesses that represent the life and vitality of local communities.

But in these rural places, immigrants are opening small businesses, providing essential health care services, rejuvenating downtown areas, and both filling and creating jobs.²⁹ They are also contributing their food, music, culture, and language and are increasingly becoming involved in local government. Immigrants are not only helping to build a more dynamic economy right now, but we are counting on them to help ensure our continued shared prosperity in the years ahead (Orrenius *et al.*, 2019). Most immigrants come to the United States during their prime working and reproductive years.³⁰ As more and more Baby Boomers retire, immigrants will not only disproportionately work as their doctors, nurses, and home health aides,³¹ but immigrants and their children also will do the lion's share of the work in filling the enormous holes in the workforce that are left behind. As the current administration has made dramatic cuts to the U.S. Refugee Admissions Program,³² it is worth talking about the important economic contributions of refugees³³

²⁴ Ibid.

²⁵ The Entrepreneurial Legacy of Immigrants and Their Children," October 10, 2018, available at <https://research.newamericaneconomy.org/report/new-american-fortune-500-in-2018-the-entrepreneurial-legacy-of-immigrants>

²⁶ Ibid

²⁷ Robert W. Fairlie and others, "2016. Kauffman Index of Main Street Entrepreneurship" (Kansas City, MO: Ewing Marion Kauffman Foundation, 2016), available at <https://www.kauffman.org/Kauffman-index/reporting>

²⁸ David Dyssegaard Kallick, "Bringing Vitality to Main Street: How Immigrant Small Businesses Help Local Economies Grow" (New York: Fiscal Policy Institute and Americas Society/Council of the Americas, 2015), available at <http://fiscalspolicy.org/wp-content/uploads/2015/01/Bringing-Vitality-to-Main-Street.pdf>.

²⁹ Sara McElmurry, "Proactive and Patient: Managing Immigration and Demographic Change in 2 Rural Nebraska Communities" (Washington: Centre for American Progress, 2018), available at <https://www.americanprogress.org/issues/immigration/reports/2018/11/14/460894/proactive-and-patient/>.

³⁰ Audrey Singer, "Metropolitan immigrant gateways revisited, 2014" (Washington: Brookings Institution, 2015), available at <https://www.brookings.edu/research/metropolitan-immigrant-gateways-revisited-2014/>

³¹ Lisa Rapaport, "U.S. relies heavily on foreign-born healthcare workers," Reuters, December 4, 2018, available at <https://www.reuters.com/article/us-health-professions-us-noncitizens/u-s-relies-heavily-on-foreign-born-healthcare-workers-idUSKBN1O32FR>; Paula Span, "If Immigrants Are Pushed Out, Who Will Care for the Elderly?", The New York Times, February 2, 2018, available at <https://www.nytimes.com/2018/02/02/health/illegal-immigrants-caregivers.html>.

³² Michael Clemens, "The President Has Mostly Wiped out US Refugee Resettlement. Other Countries Aren't Picking up the Slack," Centre for Global Development, February 5, 2019, available at <https://www.cgdev.org/blog/president-has-mostly-wiped-out-us-refugee-resettlement-other-countries-arent-picking-slack>.

³³ Christina Goldbaum, "Luring Refugees: N.Y. Cities Desperate for People Try a New Strategy," The New York Times, May 13, 2019, available at <https://www.nytimes.com>.

particularly to places such as Utica, New York, Clarkston, Georgia, and Fargo, North Dakota that have increasingly turned to refugees over the years to help revitalize local communities and, again, fight population decline. Refugees thrive in America and build United States economy.³⁴ Despite the obstacles, that drive helps to explain why refugees thrive in America.³⁵ Refugees have high labour force participation rates and become a net economic positive for the country within only eight years of arrival.³⁶ Undocumented workers are fully integrated into the economic prosperity of this country. In 2016, CAP worked with two leading economists to study the economic impacts of removing all undocumented workers from the workforce.³⁷

Every industry would suffer significant damage, but some would see workforce reductions of up to 18 percent or more, with long-run GDP losses in the tens of billions of dollars annually for every industry.³⁸ The outline of potential “labor migration” programs is apparent in data on the aging and shrinking workforces in developed states, and the younger populations in developing states that would willingly migrate to work. This dynamic has been “mitigated” in the United States by the relative youth and high fertility rates of its large immigrant population (Reznik *et al.*, 2005-2006). To address this emerging demographic crisis, the United States should reform its legal immigration policies and make it a national priority to attract necessary skilled and unskilled workers over the next three decades. If it fails to do so, policymakers and the public may well be looking back nostalgically on the era of large-scale undocumented migration from Mexico in the 1990s and early 2000s. Estimates of the immigration surplus are typically based on simulations or back-of-the-envelope calculations using the share of GDP that accrues to workers, the size of the foreign-born workforce, and the responsiveness of labour demand to changes in wages. In a standard competitive model, the immigration surplus is between 0.2 and 0.4 percent of U.S. GDP. In any case, a plausible range under standard assumptions and in a US\$20 trillion economy (roughly the size of the United States) is US\$40 billion to US\$80 billion per year in income gains to U.S. natives from immigration. Many developed states (United States) will demand for immigrants from 2010 to 2050 just to maintain a stable workforce and a steady ratio between residents age 65 and above and working residents between the ages of 20 to 64. Spatial polysingularity construct can be applied to agriculture and environmental social-ecological system (SES) challenges. Humanity receives many ecosystem services, such as clean water and air, food production, fuel, and others.

Yet human action can render ecosystems unable to provide these services, with consequences for human livelihoods, vulnerability, and security (Folke *et al.*, 2002). The social-ecological system (SES) concept arose when “[i]ntegrated studies of coupled human and natural systems revealed new and complex patterns and processes not evident when studied by social or natural scientists separately” (Liu *et al.*, 2007). It refers to an “ecological system intricately linked with and affected by one or more social systems. Both social and ecological systems contain units that interact interdependently and each may contain interactive subsystems as well” (Anderies *et al.*, 2004).

³⁴ Silva Mathema, “Refugees Thrive in America: Trump Cuts the Number of New Arrivals Despite Advancements and Success Stories” (Washington: Centre for American Progress, 2018), available at <https://www.americanprogress.org/issues/immigration/reports/2018/11/19/461147/refugees-thrive-america/>.

³⁵ Hamutal Bernstein, “Bringing Evidence to the Refugee Integration Debate,” Urban Institute, April 9, 2018, available at <https://www.urban.org/research/publication/bringing-evidence-refugee-integration-debate/view/full-report>.

³⁶ Ryan Edwards and Francesc Ortega, “The Economic Impacts of Removing Unauthorized Immigrant Workers” (Washington: centre for American Progress, 2016), available at <https://www.americanprogress.org/issues/immigration/reports/2016/09/21/144363/the-economic-impacts-of-removing-unauthorized-immigrant-workers/>.

³⁷ George J. Borjas, “The Economic Benefits from Immigration,” *Journal of Economic Perspectives* 9, no. 2 (Spring 1995): 3–22, <https://doi.org/10.1257/jep.9.2.3>.

There are different terms used in the literature to capture this idea, such as: coupled human and natural system (CHANS), human ecosystems, eco-social systems, coupled human-environment systems, and socio-ecological systems. The SES concept makes explicit the two-way linkages between social and ecological systems. This includes links related to policies, management institutions, people's knowledge (e.g., local or traditional knowledge), as well as informal social rules and norms that influence how humans interact with the environment (Table 3, Figure 3).

It also emphasizes that the couplings between social and ecological systems constitute a new complex adaptive system with its own emergent properties and feedbacks (Berkes *et al.*, 2003; Gunderson and Holling, 2002; Waltner-Toews and Kay, 2005). "Couplings between human and natural systems vary across space, time, and organizational units (spatial). They also exhibit nonlinear dynamics with thresholds, reciprocal feedback loops, time lags, resilience, heterogeneity, and surprises termed polysingularity. Human interests and ecological systems has three dimensions: (1) the material dimension "encompasses practical welfare and physical requirements of life, such as income, wealth, assets, physical health, the ecosystem services provided by the physical environment and livelihood concerns among others" (Armitage *et al.*, 2012); (2) the relational dimension "emphasizes social interactions, networks of support and obligation, collective actions, and the relationships involved in the generation and maintenance of social, political, and cultural identities (Armitage *et al.*, 2012) ; and (3) the subjective dimension "incorporates cultural values, norms, and belief systems, and importantly, accounts for notions of self; individual and shared hopes, fears, and aspirations; expressed levels of satisfaction or dissatisfaction; trust; and confidence" (Armitage *et al.*, 2012) . The above narratives show, how people exert in negotiating their adaptation strategies; and how, this feeds back into the resilience of the social-ecological system (Coulthard, 2012), Figure 3. Policy formulation the above narrative for policy development like nation interest for contexts specific situation scenario management. The UNDP (2007) defines governance as "the system of values, policies and institutions by which a society manages its economic, political and social affairs through interactions within and among the state, civil society and private sector", an illumination of wicked problems framework (WPF) construct.

Infrastructure : Case study CHINA Belt and Road Initiative (BRI)

The economic corridor is an integrated framework of economic development within a designated geographical area, which places trade-related infrastructure at the core, but goes further to encompass interconnected issues of public policy, regulations and operational practices required for stimulating economic growth and development within the designated area (Athukorala and Narayanan, 2018). The definition includes three important fundamentals of a corridor development program: the building of infrastructure, business easing (logistical) modifications, and refining the investing settings. At a given time amongst economic corridors, "policy" urgencies can, of course, fluctuate depending on domestic growth urgencies and indigenous financial circumstances of the constituent nations/territories. The satellites aboard, Xingyun-2 01 and Xingyun-2 02, are the first in a planned constellation of 80 low Earth orbit satellites designed to support the so-called Internet of Things and 5G, which connects a host of sensors and everyday objects through wireless communications.*

³⁸Jawetz, Tom (2019). Building a More Dynamic Economy: The Benefits of Immigration centre for American Progress | Jawetz Testimony Before the U.S. House Committee on the Budget.

* Meghan Bartels May 12, 2020 <https://www.space.com/china-kuaizhou-1a-rocket-launches-internet-of-things-satellites.html>

The importance of “economic corridors as boundary organization” as an instrument for progression is narrowly associated with the example for building financial clusters. To soften this procedure, there also exists the option to develop cross-border “Special Economic Zones (SEZs)”. The world has a large infrastructure gap constraining trade, openness and future prosperity. Multilateral development banks (MDBs) are working hard to help close this gap. Most recently, China has commenced a major global effort to bolster this trend, a plan known as ‘the Belt and Road Initiative (BRI)’. China and economies that have signed co-operation agreements with China on the BRI (BRI-participating economies³⁹) have been rising as a share of the world economy. The BRI is overseen by the “Leading Group” for promoting its work hosted by the National Development and Reform Commission (NDRC) which oversees and coordinates all BRI projects (including inter alia with the Ministry of Commerce (MOFCOM), the Ministry of Foreign Affairs (MFA), and the Development Research Centre of the State Council (DRC).⁴⁰

BRI investment projects are estimated to add over USD \$1 trillion of outward funding for foreign infrastructure over the 10-year period from 2017.⁴¹ While new vehicles have been formed to help with the financing, such as ‘the Silk Road Fund’, most of the Chinese funding for these projects will actually come from state-directed development and commercial banks. China is also supporting a multilateral approach to investment including MDBs and private-public partnerships (Xi, 2017a,). The BRI is best summarised by President Xi: “China will actively promote international co-operation through the Belt and Road Initiative. In doing so, we hope to achieve policy, infrastructure, trade, financial, and people-to-people connectivity and thus build a new platform for international co-operation to create new drivers of shared development” (Xi, 2017b) encapsulated by the WPF construct, Figures 3 and 4. Linking up road and rail connections with global ports is essential for the functioning of the maritime road aspects of the BRI. Figure 4 shows the BRI broad pattern of these connections and value co-creation in Tables 2 and 3. It discusses the BRI within the context of broader global infrastructure needs and China’s longer-term economic strategy for itself and other participating economies, both those in the Asian region and beyond (Africa, Europe, Australasia and Latin America have all been mentioned).

President Xi emphasises “policy, infrastructure, trade, financial, and people-to-people connectivity” accentuates warfare ecosystem participants (Tables 2 and 3). The latter involves education, cultural and scientific exchanges to help other countries learn from China’s development experience and the President has launched the Centre for International Knowledge on Development⁴² and China’s National Plan on Implementation of the 2030 Agenda for Sustainable Development along with other related initiatives.⁴³ A stocktaking of global infrastructure needs reveals varying numbers and methods, yet all sources point to a growing global infrastructure investment deficit. Based on these sources, annual investment needs range between USD\$2.9 trillion and USD\$6.3 trillion. At current investment trends, this is expected to translate into a cumulative investment gap of between USD \$5.2 trillion until 2030 (McKinsey, 2016), or as high as USD\$14.9 trillion until 2040 when the achievement of the sustainable development goals (SDGs) is taken into account (Hub, 2017).

³⁹ New Eurasia Land Bridge: involving rail to Europe via Kazakhstan, Russia, Belarus, and Poland.

⁴⁰ China, Mongolia, Russia Economic Corridor: including rail links and the steppe road-this will link with the land bridge.

⁴¹ China, Central Asia, West Asia Economic Corridor: linking to Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, Turkmenistan, Iran, and Turkey.

⁴² China Indochina Peninsula Economic Corridor: Viet Nam, Thailand, Lao People’s Democratic Republic, Cambodia, Myanmar, and Malaysia.

⁴³ China, Pakistan Economic Corridor: Xinjiang Province will be most affected. This important project links Kashgar city (free economic zone) in landlocked Xinjiang with the Pakistan port of Gwadar, a deep water port used for commercial and military purposes.

On an annual basis, this means that global infrastructure investments are, on average, falling short by USD\$ 0.35 – USD\$0.37 trillion per year (GI Hub, 2017 and McKinsey, 2016). For Asia alone, estimates by the Asian Development Bank (ADB, 2017) point to investment needs of around USD \$26 trillion until 2030 (including climate-related needs). This is supported by Hub (2017) and McKinsey (2016) who see around 50% of their respective investment need estimates related to the Asian region.

The China–Pakistan Economic Corridor

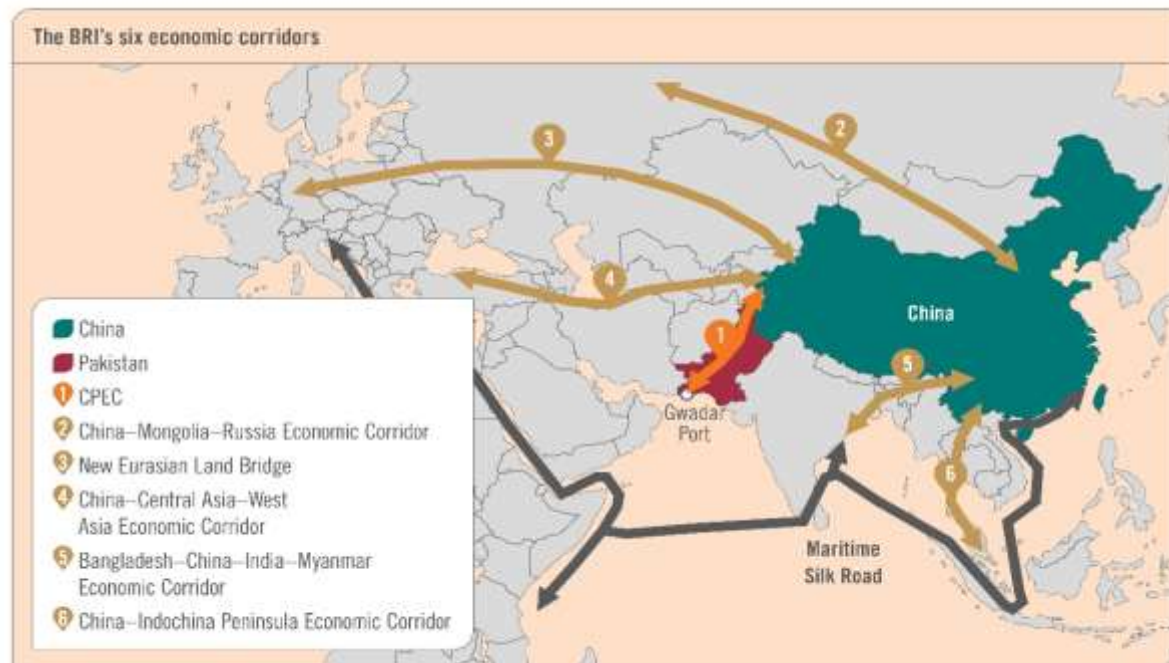
Being a long-term project that goes beyond 2030 (Ministry of Planning, Development and Reform 2017), the CPEC is divided into three phases: early harvest projects (EHPs) (priority projects for the first five years), medium-term, and long-term (China International Development Cooperation Agency, 2019). The construct warfare ecosystem like the Belt and Road Initiative (BRI), China's vision of an economic belt fashioned after the ancient Silk Road, could have a profound impact on regional economic development across Asia, Europe and Africa, Figure 5. The colossal scale of the BRI, which comprises both an overland Economic Belt and a Maritime Silk Road, is exemplified by the 4.4 billion people and the cumulative gross domestic product (GDP) of around USD\$21 trillion that it is set to encompass (Rolland,2015). Such grandiose transport infrastructure projects are not unprecedented, with examples for instance during the American Gilded Age, when the construction of railroad lines unified a disparate patchwork of territories, decreasing the cost of transport, catalysing the spread of new products and opening opportunities for the exploitation of natural resources (Rolland,2015). Similarly, Baghdad Railway, envisaged to run through Turkey and Mesopotamia, bypassing the maritime chokepoint of the Suez Canal up to the Indian Ocean, was full of the promise of accelerated trade and economic growth between Europe, the Ottoman Empire and the Far East - until Britain curtailed the project, threatened by German encroachment on Britain's dominion over the Indian Ocean (Brewster,2017). Additionally, improvements in the quality and quantity of infrastructure are positively correlated with the boosting of human and physical capital which, in turn, leads to growth (Mayaki,2017).

Under the bilateral trade agreements, foreign investors receive greater protection and security not generally available to domestic businesses (Vandeveld, 1998). The China - Pakistan Economic Corridor (CPEC) was launched in 2015 as the flagship and leading project of China's Belt and Road Initiative (BRI) (Global Times, 2019). The CPEC was given priority and precedence over the five other corridors of the BRI due to:

- i. The strategic geographic location of Pakistan and its Gwadar Port (the latter is the converging point of the Silk Road Economic Belt and the twenty-first century Maritime Silk Road). Gwadar's significance had been highlighted long before the launch of the CPEC by Robert Kaplan, who summarised Gwadar's strategic potential as 'the hub of a new Silk Road, both land and maritime; a gateway to landlocked, hydrocarbon rich Central Asia' (Khan, 2016); and;
- ii. The time-tested and all-weather strategic partnership, signifying the unique state-to-state and also the close people-to-people connectivity and goodwill, that is above political partisanship (Weidong,2017).

The CPEC is a mammoth US\$46bn investment from China, which was later extended to US\$62bn (Shaikh, 2018) for the completion of all its projects, set to culminate in 2030 (Ministry of Planning, Development and Reform, 2017). The CPEC was a strategic decision by China to choose Pakistan as the pilot project of the BRI, the lessons and experience of which would determine the learning curve of how to execute Belt and Road projects in other BRI host countries and corridors (Rehman,2018). The CPEC is about infrastructure, energy, and maritime and cultural connectivity, under one umbrella and brand. CPEC is a warfare ecosystem mechanism of power, economy and

global security for China grand strategy in foreign relation in 21st century that accentuate spatial polysingularity construct (Tables 2, 3 and 4 respectively).



Source: The IFF China Report 2020
<https://www.centralbanking.com/central-banks/economics/4737976/corridor-of-power>

Figure 5 | China Belt and Road Initiative (BRI)' and the BRI-participating economies.

Scenarios (S) : Globalisation

We are witnessing a process of creating transnational “para-state” in the form of supranational political governance that creates a unique global space (spatial) like China BRI-participating economies (Figure 5) affirming Table 3 and Figure 3 respectively. Therefore, the intricate symbiosis of politics and economy are getting stronger globally (warfare ecosystem). There is no doubt that this aspect of globalisation has led to growing economic integration and obtained the global connections and ideological grounding of economic development to neoliberalism and market fundamentalism, termed polysingularity (Table 2). Three regional blocs in the world economy have been created (the USA, the EU AU, and Asia) and three international economic institutions (International Monetary Fund, World Bank and WTO) that have a strong influence on international economic relations ‘production possibility frontier’ of the participating countries create the warfare ecosystem (Tables 2 and 3). This aspect of globalisation limited the role of sovereign nation-state, market expansion over the entire planet without visible boundaries of the process, the accumulation of wealth in fewer and fewer countries, and growing disparities between the rich and the poor (spatial construct for mechanism of power and national interest). More than 20 years ago, “farsighted” economists have predicted the creation of a new, global economy, which is obviously different in many ways, compared to the widely accepted international economy. No matter on the remarkable economic prosperity to which the economic aspect of globalization led, it is obvious that the benefits are not even close to be ‘fairly distributed’ (Arifovic, 2010).

Culture, discussed in the context of globalisation means, ‘the awareness of belonging to the world community’. All this leads to homogenisation of tastes, lifestyles, languages, etc. In this way, cultural differences disappear (Kirmse, 2010), and the brands are treated as “own” (Table 3). On the

other hand, the same process leads to the formation of powerful monopolies in the production of technical and technological means to produce the world's cultures (internet of things). The concentration of power is expressed in the world's news agencies, and about 90% of total world production of information, the press, radio and television is the product of a few international news agencies. The vast machinery of media monopoly creates awareness of reality and shape public opinion (Mitu, 2011), and undoubtedly create awareness of hyper-reality and artificial reality. Unlimited possibilities of information technology and the Internet (Borghoff, 2011), have extended the dispersion of culture (Figure 4). We can conclude that the cultural dimensions of globalisation (Ghosh, 2011) as a powerful global industry have become a key lever of the global order of power. Bearing in mind that globalisation is a repugnant process affirmed by Pichler (2012), who believe that, 'the objective can only be considered by examining the positive and negative effects of this process'. Certainly, the current world economic crisis has demonstrated the advantages, boundaries (limits) and weaknesses of globalisation (polysingularity). Even the existence of numerous dilemmas, positive effects of globalisation on the economic and social prosperity are indisputable. Some of the main positive economic impacts of globalisation are:

- i. The growth of international integration of markets of goods, services and capital, which is achieved due to the unprecedented scope and intensity of world trade, global financial flows and the production of transnational corporations (Held and McGrew, 2000);
- ii. The encouragement of a new global division of labour, which is due to a number of manufacturing processes to reallocate global scale (Dicken, 1998);
- iii. Greater freedom of movement of goods (lowering barriers to international flows of goods and services, which resulted in increased interest in international specialisation and has led to rapid expansion of international economic transactions);
- iv. Strengthening the intensity of international competition, radical reduction of transport and communication costs (Strange, 1996) due to significant investments in infrastructure (road networks, ports and airports, warehouses, modern equipment and technology, etc.);
- v. The efficient allocation of savings, and greater mobilisation of savings through a more open approach to the increasing number of financial instruments in different markets - financial globalisation (International Economy, 2011; Singh, 2012);
- vi. Easy access to foreign products allows opting between wide quality range at lower cost; the strong integration of national economies into the world economy through trade; higher education level (Hickman and Olney, 2011; Koirala-Azad and Blundell, 2011).
- vii. On the other hand, many negative effects of this process are acknowledged (Andreas, 2011; Dewhurst *et al.*, 2011). Some of the most important are:
- viii. Globalisation, in the opinion of the many it brings many benefits that are not allocated either automatically or evenly across countries;
- ix. Globalisation promotes deregulation, and reduces the role of nation states (Chase-Dunn, 1999; Scholte, 2001), which opens a real danger to enter into the zone of laissez-faire capitalism, which can lead to riots;
- x. Intensification of speculative activities lead speculators make money by switching certain factors of production from countries where they are cheaper into countries where they are more expensive, while producers locate their factories to cheapest places (Soleyman, 2010; Plut, 2008);
- xi. Labour - underage workers, extended working hours;
- xii. Threatened political and economic sovereignty and the creation of globalism as an ideological concept that brings a universal standard for the whole world; and
- xiii. The pandemic spread of the economic crisis and other negative phenomena in the whole world, such as organised crime (Das and DiRienzo, 2009), terrorism, drug addiction, etc.

All factors of globalisation have much stronger effect on “small” countries than on the large ones. Some authors have tended to emphasise the generally negative effects of globalisation on developing countries in transition, such as the “brain drain”, increase in poverty and inequality and high levels of corruption (Masteikienė, 2011). What is absolutely true is that globalisation cannot be stopped. However, some believe that, it should be made functional (Brown, 2008). It is an open question - how to affirm its positive effects, and limit or stop negative ones and one way of preserving globalisation as a process (Rodrik, 2007). This recursive thinking requires spatial polysingularity construct for the context specific situations (Table 4).

Stakeholders: BRI - One corridor, multiple passages

By engaging these stakeholders that are ultimately power centres who matter, potential concerns or insecurities (often present in developing countries that have limited experience in dealing with an influx of foreign personnel or companies) would be deflected and/or addressed in a timely manner. This, coupled with a well-conceived, facts-based, and sustained communication campaign is necessary to apprise stakeholders of the benefits of particular projects to them and the economy, and to make them part of the solution (Tables 2 and 3). The absence of a one-window solution where Chinese companies, and any foreign investor for that matter, both new and existing, can go for assistance and help, was and remains all the more necessary (Figure 3). The CPEC can be described as ‘one corridor, multiple passages’ (Xinhua News, 2016), envisioned as a long-term project that would go up until 2030. It is an infusion of connectivity projects (Figure 4) consisting of infrastructure, energy, ports, railways, and people-to-people projects, which enhance Pakistan’s trade connectivity, export potential, and geopolitical relevance significantly (World Bank, 2018). The CPEC is representative of the whole of Pakistan (Figure 5). It has three major routes: the central, eastern, and western routes, which connect Gwadar to Kashgar, and which include all of the provinces of Pakistan. Examples of CPEC projects across the country include the Karot hydropower project in Azad Jammu and Kashmir (AJK), the Rashakai SEZ in KPK, the Jhimpir UEP wind power project phase one in Sindh, the 1,320 MW CPHGC coal-fired power plant in Hub, Balochistan, and the Sahiwal coal power project in Punjab. Hence, the corridor is not confined to any specific route or province but meets geographical inclusivity (spatial construct).

The CPEC has the potential to transform Pakistan into a hub of regional economic cooperation, as it seeks to connect South, Central, and East Asia, along with the Gulf countries. Plans for this inter regional hub role are already underway with the 9th Joint Cooperation Committee (JCC) meeting taking place in November 2019, and the Gwadar International Airport project entering the initial stages of development, with the latter being financed by a grant of US\$230m provided by the Chinese government.⁴⁴ In February 2019, during the visit of Saudi Arabia’s Crown Prince, Mohammad Bin Salman, announced a new US\$8-9bn oil refinery investment in Gwadar (Kiani, 2018). Iran has also shown interest in participating in the CPEC and connecting its Chabahar Port with Gwadar Port. To further the regional connectivity potential emanating from the CPEC and institutionalising a mechanism for third-party participation, a meeting was held of the Joint Working Group on International Cooperation during the eighth JCC, held in November 2018 in Beijing, which featured the participation of the Foreign Secretary of Pakistan and the Vice Foreign Minister of China (Radio Pakistan, 2018; Rehman, 2019). In addition to rapid development via the CPEC, Pakistan is being re-branded as a country which is an investment-friendly destination, and a market that international companies must factor in when they explore opportunities for out-bound investment, Figure 5.

The establishment of a ‘CPEC Secretariat’ (Rana, 2019) has finally been announced which would likely serve as the go-to organisation for all CPEC related matters (Boundary Organization). In the first two years after the launch of the CPEC in 2013, resentment and a sense of disenfranchisement

was witnessed from the provincial lawmakers in Balochistan (Shahid,2018) and Khyber Pakhtunkhwa, who claimed that they had not been consulted and included in the decision-making process with regard to the CPEC. Later, the government established a Parliamentary Committee on CPEC (Parliamentary Committee on China-Pakistan Economic Corridor,2016) comprising both the houses of the parliament, and consisting of all political parties including the opposition, to garner consensus and right any wrongs that may have been committed in the nascent stages of decision-making by the government (The Routine,2018).The CPEC is as much about access to basic necessities for the ordinary Pakistani as it is about major investments and projects in energy, infrastructure, and industrial zones. After the successful completion of the EHPs, the CPEC now consists of people-focused projects (Hussain, 2019). A new Joint Working Group on Socioeconomic Development was established under the Joint Coordination Committee of the CPEC in 2018, which is aligned with the Sustainable Development Goals (SDGs) of the United Nations (Sheikh, 2016).

FINDING AND ANALYSIS

China Grand Strategy

Being a long-term project that goes beyond 2030 (Ministry of Planning, Development and Reform 2017), the CPEC is divided into three phases: early harvest projects (EHPs) (priority projects for the first five years), medium-term, and long-term (China International Development Cooperation Agency, 2019). Pakistan has decided to lift lockdown to kick-start its tottering economy. The growth engine of Pakistan's economic revival is powered by CPEC, flagship project of the Belt Road Initiative (BRI). It is tempting to conjure up nightmarish scenarios, especially in pandemic induced global recession. Notwithstanding, our antagonism, laced with some degree of 'schadenfreude', it may be gross under estimation of Chinese resilience and persistence. BRI, conceptualised, in pre-Covid-19 era is an audaciously, ambitious project designed to stamp China's centrality in reordered global economic ecosystem⁴⁵. Hailed as 'Project of the Century' by Chinese President Xi Jinping, it seeks to cover 65 countries, touching lives of 62% of global population. It's bevy of projects, entail expenditure of 30% of world GDP, transporting 75% of energy products.

Simply put, it will put China at the hub, connectivitness radiating along Maritime Silk Road (String of Pearls, in Indian context) and BRI - with multiple surface links, Figure 5. China justifies bilateral format, to surgically resolve issues and ensure adherence to deadlines. Most projects are Chinese driven with minimal local participation and capability building labour and ancillaries sourced from China. The predatory nature has led to debt trap and even leasing of Sri Lanka's Hambantota port for 99 years. Noted strategic commentator Christine C. Fair has described CPEC as "Colonisation of Park by Economic Corridor", harking back to comparisons with East India Company (grand strategy). This grandiose project has significant geostrategic consequences with economic connectivity meshed in (warfare ecosystem, Table 2). Given Pakistan's sprawling geography, the development of remote areas has been a gigantic task requiring enormous budgetary resources. Thanks to the BRI and CPEC, Pakistan has been transformed to an electricity surplus country, successfully overcoming electricity shortages through CPEC power projects. China is frontrunner on pandemic curve, emerging as leading supplier of medical equipment, medicines and expertise. It is also in the race to produce vaccine with domain competence and data bank on viruses. Developing countries are being showered with medical aid, giving shape to health silk road, notwithstanding, quality issues. 5G (internet of things) powered by Huawei has been activated on Mt. Everest as part of digital silk road, Figure 4.

⁴⁴ Interview by Hamna Husain with Lijian Zhao, Deputy Chief of Mission, Chinese Embassy, 1 June 2019.

⁴⁵ Taking stock of China-Pak economic corridor Lt General K J Singh.

<https://timesofindia.indiatimes.com/blogs/generals-jottings/taking-stock-of-china-pak-economic-corridor/>.

China will harness space (Figure 4) as medium with add-ons like facial recognition, geo-tagging, Artificial intelligence (AI) and robotics (spatial construct). Chinese economy is limping back and global rating agencies forecast that despite deceleration it is likely to register positive growth. While downsizing, reprioritisation and repackaging is axiomatic, yet the Dragon's persistent patience will ensure salvaging of projects, albeit in slowed down mode. Feeble articulations for multilateralism are unlikely to find traction as UN, WHO, WTO and even EU are on retreat. America under President Trump is looking inwards, distracted by internal politics. Japan with surplus funds is likely to remain focussed on decoupling and relocation of manufacturing chains. With no viable alternatives, debt rescheduling, more loans and enhanced Chinese suzerainty are inevitable. BRI addresses, Chinese compulsions of excess project execution capability, especially skilled labour and surplus funds. While availability of resources will reduce but compulsion to apply stimulus and employ workforce may increase due to relocation of manufacturing. The choice would obviously be CPEC with early harvest dividends. Pakistan's contribution in this strategic relationship has not been any less significant. Back in 1971, Pakistan was the facilitator in a secret trip that then US Secretary of State Henry Kissinger took to China, that in turn, led to the historical visit in 1972 of President Richard Nixon to Beijing.

Pakistan also extended its assistance to China after the 1989 Tiananmen Square crackdown. It has lent its support to China to transition from its current status of an observer to a member of South Asian Association for Regional Cooperation (SAARC) (Vandewalle, 2015). This strategic rerouting of oil supply will cut the existing shipping time for China from 45 days to only 10 days. In addition, for the landlocked countries of central Asia, it would provide a viable access to the Arabian Sea (Ebrahim, 2015). During the second Belt and Road Forum in May 2019, China allocated US\$1bn for 27 projects under this new working group, including in education, health, agriculture, water and irrigation, poverty alleviation, and human resource development (Hussain, 2019). The areas of these projects are: (1) establishing technical and vocational training institutes, which is in line with sustainable development goal (SDG) 8 - decent work and economic growth; (2) establishing health-care facilities and thereby making health care accessible (SDG 3 - good health and wellbeing), and the provision of educational facilities in disenfranchised areas (SDG 4 - quality education); (3) clean drinking water projects such as the Gwadar desalination plant (SDG 6 - clean water and sanitation); and (4) agriculture and poverty alleviation projects (SDG 1 and 2 - no poverty and zero hunger).

Furthermore, Gwadar City's development is being envisioned as creating a clean, green, and environment-friendly city (SDGs 7 and 13 - affordable and clean energy and climate action), whilst the SEZs under the CPEC will create an enabling environment for investment, generating jobs and enhancing industrial development, leading to economic growth [SDGs 8, 9, and 10 - decent work and economic growth; industry, innovation and infrastructure; and reduced inequality] (Ali, 2018). The liberalist argument holds that CPEC is based upon China's relationship with Pakistan and its foreign policy principles of non-interference and non-aggression in line with Zhou En Lai's Five Principles of Peaceful Coexistence.⁴⁶ One of the five principles is "equality and cooperation for mutual benefit." In line with this principle, mutual benefits and the degree of utility for Pakistan's economy are likely key considerations while carrying out investments. Realism suggests that economic interests also explain China's motivations. Given the proposed route of the corridor linking Kashgar to Gwadar, it is fair to envision that China would be able to secure the shortest access to the Arabian Sea through Pakistan. Pakistan thus offers the most promising profile given its strong relationship with China and its proximity to the Arabian Sea. Attaining access to the Middle East with its massive oil reserves provides China with opportunities to import petroleum and export its goods and services to new markets. The paper three (3) will focus of the impacts of BRI on world economy and geo-politics.

Development of the port of Gwadar as a SEZ allows for greater connectivity with key financial centres in the region such as Dubai, which China would certainly find attractive as it seeks its own footprint in the Persian Gulf. China may be seeking to establish goodwill with states such as Pakistan as part of an emerging soft-power strategy.⁴⁷ Chinese motivations to invest in Pakistan are based upon prospects for economic cooperation in conjunction with security interests. CPEC could simultaneously address Pakistan's energy-starved economy and bolster Pakistan's relations with neighbouring Iran, who has expressed interest in being a part of CPEC, through cross-border energy cooperation.⁴⁸ One of the stated goals of the OBOR initiative is to promote greater regional connectivity. CPEC gains relevance given that Pakistan has not been made part of other arrangements aimed at promoting greater regional connectivity such as the Transport Corridor (TC) agreed upon by Iran, Afghanistan, and India.⁴⁹ The United States has a stake in South Asia's regional stability and economic prosperity. Its interests centre on a stable Afghanistan and peaceful India-Pakistan relations for which Pakistan's economic prosperity is important. This seems to be the consensus view of the strategic community in the United States, despite U.S.-Pakistani disagreements on such issues as peace with India, its nuclear program, and counterterrorism.⁵⁰ It is due to their ability to promote unbiased development amongst regions through nation-states that have shared boundaries, also amongst territories in nation-state with substantial regional earnings differences (Tables 3 and 4). In Asia, Economic corridor development gained additional push after China's initiative to establish "China-Pakistan Economic Corridor (CPEC)" that is expected to hook up "Western China to the Arabian Sea" through Pakistan as a flagship project of its "One Belt, One Road initiative" (Athukorala and Narayanan, 2018).

Economic corridors have become very popular during the last thirty years as a way for sub-regional financial growth, though the practice of 'corridor' as a notion of realistic and urban development has an elongated record, which dates back to 1880s (Priemus and Zonneveld, 2003). Through BRI, which is China's utmost worldwide financial drive, China is targeting at inspiring financial growth in extensive territories in "Asia, Europe, and Africa", that is, 'equal to 64 percent of the global populace and 30 percent of the global Gross Domestic Product (GDP)'. To carry on its robust growth, this drive is developed to restructure the external sector of China. Although infrastructure growth performs a vital part, the BRI is an inclusive project, also containing strategy discourse, unhindered trade, economic sustenance and people-to-people exchange (Martincus *et al.*, 2017), Tables 2 and 3. China considers that CPEC would bring internal accord and financial constancy within Pakistan and as well as appeases the former's western restless Xinjiang province (Zhiqin, 2016). Thus, the CPEC, with enhanced logistics efficiency, generates immense possibilities for West China to open to the world (Shaikh *et al.*, 2016). As barriers to trade were significantly pulled to pieces through individual and joint improvements, it became obvious that without balancing business-related infrastructure, the technological capability to manufacture and supply products whereas sustaining quality measures, and without eliminating several other obstacles to resource allocation and business, trade liberalization alone would not produce the expected result (Bougheas *et al.*, 1991). Spatial polysingularity construct consists of system of values, nurturing sources of resilience for renewal, reorganization and adaptive governance (Figure 3, Tables 2, 3 and 4).

Wide consultation (China BRI project) with all relevant stakeholders is a challenging concept, but it is essential that people agree on the nature of the problem before seeking solutions that will require their long-term commitment (wicked problems, Table 4). Wide range of participatory methods that can be used to engage in consultation with different stakeholders are available such as participatory mapping or modelling, to more creative methods such as participatory photography/video or even theatre (spatial construct, Figure 3). Scenario-based methods are often presented as useful tools for building social-ecological resilience (Folke *et al.*, 2002) or sustainability (Clark, 2007). A field guide

was developed collaboratively by the centre for International Forestry Research (CIFOR), the ASB-Partnership for the Tropical Forest Margins, a system-wide program of the Consultative Group on International Agricultural Research (CGIAR), and the World Agroforestry Centre (ICRAF). President of China Xi, 'All countries should respect each other's sovereignty, dignity and territorial integrity, each other's development paths and social systems, and each other's core interests and major concerns' (Xi, 2017a) affirmed by WPF construct, Tables 2 and 4 respectively. China 'warfare ecosystem' pursue innovation-driven development and intensify co-operation in frontier areas such as digital economy, artificial intelligence, nanotechnology and quantum computing, and advance the development of big data, cloud computing and smart cities so as to turn them into a digital silk road of the 21st century" (Xi, 2017a), Figure 4 called 'Industry 4.0'. The BRI will also support China's need to move up in the value-added chain towards high-technology and services sectors. The 'hardware-first' strategy creates an external demand for materials and for China's technology and knowhow. China's new environmental "polluter pays" regulations have reduced profits in cement industries within China, giving them a market incentive to move out along the Silk Road (Kley, 2016; Chun, 2015). The president of the World Bank, an institution which is able to tap resources from all economies in the world, recently stated it had ongoing projects worth USD 86.8 billion in (then) 65 BRI-participating economies (Kim, 2017).

America Grand Strategy - Globalization Consequences

Globalization increased movement of goods, capital, and workers across national boundaries (Bardham *et al.*, 2006; Greico and Ikenberry, 2003); pro-growth effects (Williamson, 2002); trade liberalization in poor countries with badly performing market structures may cause unemployment increases and declining productivity (Stiglitz, 2005); rising world income inequality (Lindert and Williamson (2003) ; and third world countries, who view the present international system as unjust could come to dominate the global policy agenda (Ocampo, 2004; Cardoso, 2006). The greatest impacts on globalization is the value creation disequilibrium to create wealth where commerce components converged: value creation (which occurs mainly through physical labour and tangible goods); communication [either externally (with customers) or internally (with employees), using multimedia human voice, print, telephones, TV, and radio] and distribution of goods and services [improved technologies of transport (by hand, ship, railway)] all three activities now converged as a digital platform (Alliance for Converging Technologies, 1997) and the outcome of globalization agenda of the United states of America. Davis and Meyer (1998) called a "blur of desires, blur of fulfilment, blur of resources"; and the "death of distance" (Cairncross, 1997). Tapscott (1995) affirmed, the real story is centred around enhanced access to the knowledge housed in the other modes of commercial activity. Globalization can be re-configured by application of chaos theory, systems thinking and adaptive living system affirmed by Kelly (1998) advises: "to achieve sustainable innovation you need to seek persistent disequilibrium without succumbing to it, or retreating from it."

⁴⁶ People's Republic of China, Ministry of Foreign Affairs, China's Initiation of the Five Principles of Peaceful Co- Existence, 1954, http://www.fmprc.gov.cn/mfa_en/ziliao_665539/3602_665543/3604_665547/t18053.shtml.

⁴⁷ Interview with senior think tank scholar "B" in discussion with the author, Washington D.C., January 2015.

⁴⁸ Khawaja Daud, "Iran Ready to Become Part of China Pakistan Economic Corridor," Daily Pakistan, April 16, 2016, <http://en.dailypakistan.com.pk/headline/iran-ready-to-become-part-of-cpec/>

⁴⁹ Niharika Mandhana, "India, Afghanistan and Iran Sign Deal for Transport Corridor," The Wall Street Journal, May 23, 2016, <http://www.wsj.com/articles/india-afghanistan-and-iran-sign-deal-for-transport-corridor-1464022867>.

⁵⁰ .Senior U.S. Government Official "D" in discussion with the author, Washington D.C., January 2015.

United Nations Commission on Science and Technology for Development (UNCSTD) has produced an 'indicators approach' called INEXSK: Infrastructure, Experience, Skills, and Knowledge to map the strengths and weaknesses for technology and knowledge accumulation in developing nations (Mansell and Wehn, 1998) and similar to the WPF construct, Figure 3. The Industrial Internet (Figure 4) combines the global reach of the Internet with a new ability to directly control the physical world, such as machines, factories and infrastructure. It is currently in its early stages of development.⁵¹ Such services, for example, can lead to changes in product portfolios, optimization of industrial-plant operation via new knowledge platforms and virtualization of ICT infrastructures, with proper consideration of attendant IT security issues.⁵² Globalisation is rising international mobility of investors and capital increases the elasticity of labour demand, and thus reduces the monopoly power of unions (Lorz, 1997). Globalisation case studies are the growth and transformation of the South East and East Asian economies where before manufacturing remains in developed countries, the Asian tigers and other newly industrialised economies (NIEs) have become the new centres of production for global trade and manufacturing (Dicken, 1998).

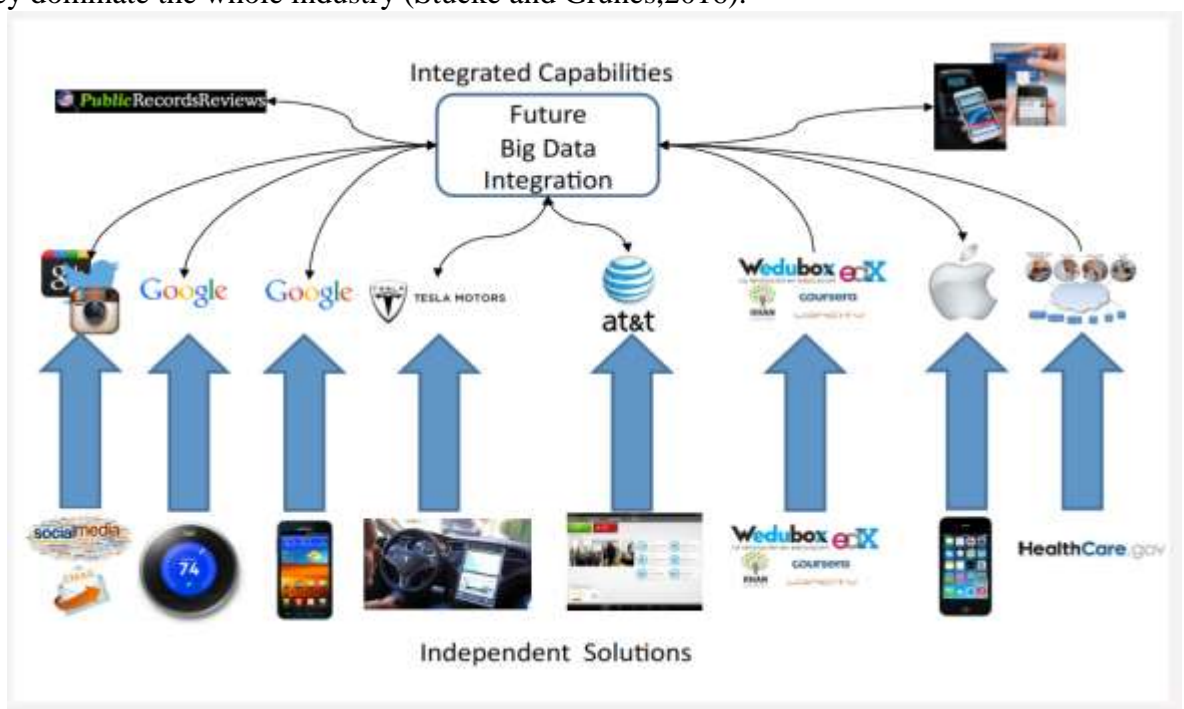
The resultant impacts are improved interconnectedness between national economies and transnational corporations and value-added processes are now diffused around the world. A new cellular phone, for instance, may be designed by a team in London, manufactured in northeast China with parts from Canada, the United States and Sweden, and then brought to various national markets by the global marketing and sales headquarters in Helsinki. Scholars like Cruce, 1623; Angell, 1907; Gartzke, 2003 have theorized that economic interdependence can lower the likelihood of war. There is another important line of theoretical and empirical work called 'Power Transition Theory' that focuses on the relative power of states and warns that, 'when rising powers approach the power level of their regional or global leader, the chances of war increase (Tammen *et al.*, 2000; Kugler, 2006) and; warns that, the rising power of China relative to the United States greatly increases the chances of great power into war frontline' which encapsulate the narrative of this paper. The way we use and distribute knowledge casts very long shadows on human societies (Chichlinsky, 1997). "China's rise will bring structural challenge to American hegemony in the Asia-Pacific region."⁵²

Globalization Agenda knowledge economy 'built on the innovation of the 'Information Age' (Drucker, 1998) focussed on and reinforced the links between research, higher education and a country's success (Thelen, 2019; Tegmark, 2018) called human capital, a recognition that advancement and value at every level begins with greater reliance on intellectual capacities and capabilities. Today, education 4.0 (emphases on employment skills, employability and intelligence) education for student-centeredness and experience with the demand for sustainable life-long love for learning and personal transformation (John, 2019). The half-life of skills acquired is getting shorter while working lives are lengthening (Gallagher, 2019). The long-term where 'foresight' that might be of greatest interest to 'Higher Education, particularly Science, Technology, Engineering, Arts and Maths (STEAM)' and all the professions (Fisk, 2018). In Figure 4 where data will become more and more important (Lewrick *et al.*, 2018). Industry 4.0 where "economies, businesses, societies and politics are being transformed by technological advances in such areas as artificial intelligence and machine learning, the Internet of things (IoTs), autonomous vehicles, drones, precision medicine and genomics, advanced materials, smart grids, , robotics and big data are participating indexes for warfare ecosystem (Tables 2 and 3) and affirmed by Samans, 2019 ; involving all stakeholders of the global polity, from the public and private sectors to academia and civil society (Schwab, 2016).

⁵¹ https://www.bmbf.de/pub/HTS_Broschuere_eng.pdf.

⁵² Wang Jisi, [Foreign Affairs Review], no. 84 (Oct. 2005): 13-16.

Education 4.0 and Industry 4.0 should be placed in an even wider adaptive system - Globalization 4.0 (Feldman,2018; Schwab,2018). Globalization 4.0 optimise the use of digital technology for what it has to offer, for efficiency, effectiveness, engagement and communication but most of all for authentic and valued educational experiences (Admiraal *et al.*,2019) but acknowledge that ideas need to be placed and understood within the wider waves of rapid change : digitalisation, globalisation, demographics, the environment, political uncertainties (Salmon and Asgari,2019; Bakhshi *et al.*,2017) and indeed life on Earth. Collaborating virtually (Figure 3), design mind-sets, new media competencies, ‘thinking like a data-scientist’ and inter-disciplinarity (Ramge and Schwochow,2018). Artificial intelligence (AI) or the capacity of machines to make predictions using large amounts of data to take actions in complex, unstructured environments (Agrawal *et al.*, 2018a). Due to network effects, data-driven mergers may increase entry barriers and enable some big firms to become bigger until they dominate the whole industry (Stucke and Grunes,2016).



Source: CNBC, 'Anonymized' credit card data not so anonymous, <http://www.cnbc.com/id/102385271#>.

Figure 6 | Data convergence, another aspect of convergence. The current stove-piped set of Internet services, and now IoT services, produce prodigious amounts of data (monetize search to direct advertising).

Indeed, some companies are adopting data-driven business models and strategies to obtain a competitive “data-advantage” over rival like Facebook’s acquisition of ‘WhatsApp’ are increasing the risk of abuses by dominant tech firms. Data-driven exclusionary practices and mergers raise significant implications not only for privacy and consumer protection, but also for competition law locally and globally. AI focus on mental rather than physical tasks as a “general purpose technology” with a wide range of applications in various sectors and occupations (Furman and Seamans,2018) like application in Agriculture 4.0 ‘introducing digital innovations, as potential savings or productivity increases are greater for large agribusinesses’⁵³ Figure 4. In the U.S., for instance, 97 percent of small businesses on eBay export, compared to just 4 percent of offline peers⁵⁴. However, to develop AI in areas such as health care, countries with smaller populations will require access to global health data. Limits on access to such data will reduce the accuracy and relevance of AI systems for developing countries. Maintaining domestic privacy standards is a key reason that governments are currently reducing the flow of personal data across borders. For instance, the Europe Union

General Data Protection Regulation (GDPR) prohibits transfers of personal data to countries that have not been deemed “adequate” by the European Commission. This could be achieved by encouraging forms of mutual recognition of privacy systems as well as developing common regional and global privacy principles.⁵⁵ Davidson and Rees Mogg (1997), see a great deterioration of state power as assets disappear into the untraceable cyberspace in which business is increasingly transacted, Figure 4.

CONCLUSION

In the post war world American large enterprises as General Motors in the 1920s, Sears, Roebuck in the 1930s, and Marks and Spencer and Wal-Mart understood the ‘globalization agenda’ reported Malone and Laubacher (1998) where global electronic networks enable these microbusinesses to tap into the global reservoirs of information and expertise. Drucker (1998) affirmed that ‘the more inside information top management gets, the more he will need to balance it with outside information and that does not exist as yet then (internet of things). Computers and broad electronic networks technologies creates national comparative advantages based on human capital and technological infrastructure (Dunning, 1993); which implies major transfers of power from national to supranational levels of government (Ostry, 1990). How well this is managed will be one important determinant of a nation’s technological dynamism in the 21st century. Solow (1957) asserted that Total Factor Productivity (TFP), gives an indication of the overall improvements in all factors of production. Romer (1993,1995) that incorporation of knowledge and technology into the production function is Globalization 4.0 ‘growth theory’ today and similar to adaptive ecological system resiliency (Berkes and Folke,1998) as a platform for economic power similar to China BRI grand strategy as warfare ecosystem of national interest and the objective of paper three (3).

Xudong (2015) asserted that China’s strategic drive to set up the “Silk Road Economic Belt” and the “21st-Century Maritime Silk Road” will place potential national as well as international growth on fast-track and China centre of gravity to become a “two-ocean power”. Indeed, the human dimension to problems solving will always be an integral aspect of the ecosystem approach, and adaptive governance by foreign policy formulation will need to reflect spatial polysingularity construct reality to avoid the execution ‘Power Transition Theory’ in world trade. Davis and Meyer (1998) affirmed that ‘fusion and cross-fertilisation of three pillars of commerce: value creation, communication, and distribution is creating a “blur of desires, blur of fulfilment, blur of resources’. The illumination of Davis and Meyer (1998) dictum is the objective of paper 3. The “network of networks” could be a primary force behind the economic development of every nation boom this century. Kurzweil (2005) predicts a future period during which the pace of technological change will be so rapid, its impact so deep, that human life will be irreversibly transformed.⁵⁶

53. 365FarmNet · White paper: Agriculture 4.0 – ensuring connectivity of agricultural equipment · January 2017

54. Ebay 2015. “Empowering People and Creating Opportunity in the Digital Single Market” An eBay report on Europe’s potential, October 2015.

55 Aaditya Mattoo and Joshua P. Meltzer 2018, “International Data Flows and Privacy: the conflict and its resolution”, Journal of International Economic Law

56. Kurzweil, R. 2005. The singularity is near – When humans transcend biology. New York, USA: Viking Penguin.

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