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## MANAGING UNCERTAINTIES VIA AN EMBEDDED FORESIGHT REGIMEN IN THE NATIONAL POLICY PLANNING ARCHITECTURE

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### Abstract:

*National policy planning can be a relatively tortuous process due to rising cross-sectoral complexities and bloated government structures. It is also becoming increasingly difficult to maintain the relevance of national policies in a rapidly-changing global environment. This paper posits that long-term policy relevance can be sustained by embedding a foresight regimen throughout the national policy planning architecture. The proposed foresight template is predicated to enable the monitoring of phases and milestones in the national policy process and thereby be continually adaptable in sync with evolving external developments and internal needs. Malaysia's automobile industry formed a partial backdrop during the development of this concept paper.*

**Keywords:** Foresight; National Policy Planning Architecture; Quadruple Helix Model; Open Source Intelligence; Complexity Theory.

**Cite This Article:** AiniSuzana Ariffin, Mathew Maavak, and Ian Miles. (2018). "MANAGING UNCERTAINTIES VIA AN EMBEDDED FORESIGHT REGIMEN IN THE NATIONAL POLICY PLANNING ARCHITECTURE." *International Journal of Engineering Technologies and Management Research*, 5(6), 1-14. DOI: 10.5281/zenodo.1304382.

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### 1. Introduction

Strategic foresight had its genesis in the systems thinking approach of the 1940s where, it was primarily used by the militaries of the United States and United Kingdom [1]. The field of foresight later acquired increasingly complex outlooks to deal with a variety of challenges. Futures thinking gradually began to evolve from linear technology forecasting techniques to more complex approaches that treated "drivers of change in social systems" as "not only multiple but also mutable." The future was therefore increasingly treated as a complex, dynamic and "partially knowable" landscape, where, the extent of its "know ability" was contingent upon the identification and interaction of elements in its ecosystem [2]. For an analogy, consider how a particular strain of microbes may develop under different laboratory conditions and stimuli. They may macerate, multiply or mutate under different conditions of humidity, temperature, nutrients and or the introduction of exogenous genetic material. Changing its nature or varying its adaptive environment may either lead to a cure for a disease like AIDS or its potential use as a bioweapon.

The future therefore cannot be an “empirical’ reality” but rather a set of “partially viewable alternatives that describe a possibility space”[3]. In the context of national policy planning, foresight aims to explore future trends and potential discontinuities to inform decision-making by narrowing down uncertainties [4]. Foresight should ideally mould the national policy planning and implementation process by injecting a degree of dynamism, manoeuvrability and adaptability over an envisaged timeline.

## **2. Foresight Strands**

The future should become tangibly clearer within reasonable spaces of possibility after being subjected to a due foresight process [5]. Tools and techniques used in scenario planning, strategic planning, environmental scanning, policy foresight and analysis of trends and megatrends — often collectively clubbed under the general field of foresight — may help elucidate “issues of complexity, uncertainty and surprises” that may impact an organization or nation [6].

Corporate foresight tends to have a narrower focus, particularly on intra-organizational communications that constructs mid-to long term visions of future markets, customer needs, and challenges to society [7]. Strategic planning, on the other hand, refers to how an organization maintains its competitive edge by determining “where the organization is, where it wants to go, and how it wishes to get there” [8]. Foresight facilitates strategic planning by encouraging multiple flows of information across industries and stakeholders in order to generate knowledge and ideas for new markets, work processes, and products.

Strategic foresight scopes out future issues of a strategic nature to an organization. These include an organization's ability to anticipate emerging opportunities and threats in the environment as well as networks, drivers, motivational factors, resource availability, alternative scenarios and preferred paths of development [9][10]. While foresight variants share many common denominators in terms of logic, methodological thrusts and process flows, they all inevitably grapple with the vicissitudes of goals, resources, and, of course, the future. Governments therefore have to factor in uncertainties into the national policy planning equation.

## **3. Snapshot of National Policy Planning in Malaysia**

Malaysia, a rapidly growing economy on the threshold of attaining a Developed Nation status, epitomizes the prevalent disconnect between foresight and national policy planning.

Malaysian policy planning has traditionally been a relatively rigid process; one marked by silo-type formulations and linear road-mappings. Disparate national goals were predetermined to meet rigid developmental thresholds. The Vision 2020 programme, for example, had mandated the actualization of internationally-benchmarked goals such as minimum income levels (economic); percentage of graduates (educational); and the number of skilled professionals (human resource), among others, to qualify Malaysia as a Developed Nation by the year 2020 [11]. Vision 2020 was therefore contingent on a comprehensive, trans-sectoral transformation of the nation's socioeconomic landscape. It was also an attempt to break free from past national policy planning due to the nature, scope and complexity of its goals. Table 1 outlines some salient national

developmental policies Malaysia had implemented since attaining independence from the United Kingdom in 1957.

Table 1: Timeline of sample Malaysian developmental policies

Period	Sample National Policy
1958 –1969	Import Substitution policy
1969 –1985	Export Orientation policy
1971 –1990	First Outline Perspective Plan; New Economic Policy
1980 -1983	Look East Policy; Malaysia Incorporated Policy
1983	Privatisation Policy (including Corporatisation Policy)
1991–2000	Second Outline Perspective; National Development Policy
1986–1995	First Industrial Master Plan
1991–2020	The National Vision Policy (Vision 2020)
1996–2005	Second Industrial Master Plan
2000	Second National Science and Technology Policy
2001–2010	Third Outline Perspective Plan; National Vision Policy
2002	Knowledge-based Economy/K-Economy Master Plan
2006–2010	9 <sup>th</sup> Malaysia Plan
2006 –2015	Third Industrial Master Plan
2010–2015	10 <sup>th</sup> Malaysia Plan
2010	New Economic Model
2013	National Policy on Science, Technology and (NPSTI) 2013- 2020
2016–2020	11 <sup>th</sup> Malaysia Plan
2017-2050	Malaysia’s Transformasi Nasional 2050 (TN50). A long-term development blueprint in progress.

Compiled by: ASH Ariffin (2017)

While Malaysia’s transformation from a Third World economy was facilitated by a series of national policies that adopted linear outlooks and methods, such templates can no longer cope with the demands of an increasingly complex future. To ride on the crest of the Fourth Industrial Revolution, Malaysia needs a more flexible approach to national policy planning. The on going National Policy on Science, Technology and Innovation 2013-2020 (NPSTI) programme, for example, epitomizes the tussle between traditional linear planning methods and the necessity for new, versatile approaches that can tackle future complexities and disruptions [12].

The NPSTI has six Strategic Thrust (ST) areas that are road-mapped in a relatively linear fashion. These are: enhancing strategic international alliances; advancing scientific and social research, development and commercialisation; developing, harnessing and intensifying talent; energising industries; transforming STI governance; and promoting and sensitising strategic thrusts [13]. A dedicated study to potential risks and disruptions in all six ST areas were however omitted due to the lack of cognizance over rising global uncertainties. STI technocrats are generally tendentious to linear planning approaches and retain a form of futures neuroses [14] to any suggestions regarding future disruptions. Malaysia is no exception in this regard. While policies like the NPSTI

may arguably meet certain quantitative objectives, they are likely to fall short of qualitative targets implicitly laid down by the overarching Vision 2020 programme. In this regard, Malaysian policy-planners should avoid the missteps of Proton, the erstwhile flagship national car manufacturer.

Proton's perennial shortcomings were induced by rigid goals, cronyism, political interferences, linear foresight approaches and flawed strategies. This was compounded by organizational overgrowth that was geared to sustain an unfair monopoly for the national car manufacturer. Insufficient work was done on exploring the future of the global automobile industry, especially in areas regarding cutting-edge technological developments; industry best-practises; evolving consumer tastes and lifestyles; and the evolution of mass transportation itself. Stiff tariffs imposed on foreign vehicles failed to deter locals from choosing Japanese, Korean and Western brands over Proton, despite Malaysia's advantageous position in having the third-highest car-ownership rate in the world [15]. After repeatedly scraping the bottom of the barrel, Proton had to be bailed out by Chinese auto manufacturing giant Geely.

Even now, a central question remains: What does the future hold for Proton? Would innovations in 3D-printing, among others, render Proton's manufacturing paradigm obsolete within the next five to 10 years? If so, 3D-printing may also be a disruptor to a cornucopia of SMEs that form Malaysia's automotive backbone. Or will Proton be reduced to assembling rebadged Geely vehicles?

Proton is a microcosm of what ails the overall national policy planning architecture. The traditional lack of vision that typified Malaysia's governments agencies need to be addressed without delay in order to avoid the middle income trap.

The old paradigm of churning out incrementally better products at higher rates of efficiency is becoming out dated for any industry. Yet, no effective agency exists in Malaysia to undertake long-term trans-sectoral foresight. Malaysia's industrial myopia is mirrored by its education sector which is failing to anticipate a future employment ecosystem that may require trans disciplinary skills within a "gig economy". The advent of artificial intelligence, automation and robotics is also rendering many industries and skillset obsolete [16]. Yet, Malaysia's national policy architecture has not progressed beyond Industry 3.0-level thinking and planning.

It is therefore critical to embed a nimble foresight regimen throughout the entire national policy architecture. Such a regimen will enable policy planners to monitor, intervene and recalibrate long-term projects with a degree of flexibility; thereby injecting long-term stability into the socio-economic sphere. Furthermore, the notion of a Developed Nation itself may change or be re-defined by global volatilities over the coming years. As long as its socioeconomic engine remains stable, Malaysia might find itself to be a Developed Nation in relative terms even if it experiences lower-than-projected economic growth over the next few years. Much of the Developed World, during this period, may face an anticipated economic meltdown till a new political or governance paradigm emerges [17].

This calls for the adoption of anticipatory foresight throughout the national governance structure. As the United Nations Development Programme (UNDP) noted: "Governments increasingly realise that few contemporary challenges can be confined to one policy area and that a single-issue

focus is in many instances insufficient” [18]. Under such circumstances, an embedded foresight regimen may securitize the future by buffering national policies against a variety of disruptive developments. Anticipatory foresight is ideally suited to grapple with rising uncertainties and complex organizational behaviour.

#### 4. Complexity, Governance and Foresight

Organizations increasingly contend with complex states that cannot be reduced to more comprehensible components *a la* Descartes, as the “knocked down” elements will only exhibit contextual behaviour during interactions in a particular environment. Governments have traditionally relied on Cartesian-type planning models that are increasingly irrelevant in a world of rapid technological and social disruptions. Effective models of governance therefore may be contingent upon understanding complex adaptive systems (CAS). Within a national policy planning architecture, a CAS generally consists of “partially connected agents whose interaction gives rise to complex behaviour. Each agent here “acts autonomously according to specific rules and in response to information received via connections to other nodes and in coevolution with the environment” [19]. The agent here refers to agencies, units, state-owned enterprises and other tributaries of the government.

The virus analogy can be used again to explain CAS. One really cannot reduce a virus outbreak into Cartesian-type components; it can only be approximated in terms of infection rates and geographic distribution, provided basic data is available. A new virus, with its accompanying unknowns, makes prognosis much more difficult. Experts would be hard-pressed to quantify or project further mutations and potentiation due to the imponderables involved. The structure of the new virus or variant would have to be studied before extrapolation is possible. Organizations likewise often behave like microscopic organisms; both depend on internal dynamics and an external ecology to react in a particular way or adopt an entirely new characteristic.

Two principal propositions underpin CAS theory. The first proposition is that “optimal amount of structure” leads to ideal interactions that produce efficiency and flexibility. This is where partially connected agents in a system perform better than highly-coupled or decoupled systems. When constitutive elements of a system are over-connected, the system becomes immobile and desensitized to emerging opportunities, which, in turn, can lead to a “complexity catastrophe”. Organizational and government structures that are overly hierarchical and inflexible tend to ossify into a state of inadaptability. On the other hand, if organizational elements are under-connected, the system becomes too disorganized, leading to an “error catastrophe” and systemic dysfunctionality. Thus, partially connected systems (i.e. those with moderate degrees of structure) offer the best organizational outcomes, both in terms of flexibility as well as efficiency [20][21][22]

The second proposition in CAS deals with the relationship between optimal structure and the environment. It argues that as environmental predictability increases, tighter structures may not be a hindrance to productivity. In such situations, key executives and national policy planners can develop relatively linear policies that mirror patterns in the environment. In contrast, as environmental unpredictability increases, greater flexibility and lesser structure will be needed to facilitate bottom-up solutions. A CAS therefore thrives on fluid organization where multiple

motors of adaptation can coevolve with a changing environment. The key challenge to organizations is finding the right structural balance as those with flexible organizational structures tend to be better-performing entities. [23] Strategy, likewise, should not be centrally dictated by key decision-makers, but should be developed from an organization's constituent units through a bottom-up process. Success in planning, innovation or commercialization is ultimately dependent on an organization's operational structure.

The greater the number of agents in an organization, the greater may be its overall entropy. This is a growing problem in fast-developing nations like Malaysia where organizational sensibilities have not kept pace with complex tasks and functions that accompany rapid growth. Instead, the need to harness organizational and mission complexities has been frequently couched in terms of pursuing innovation. The outcome – not surprisingly – has been an overgrowth in cross-jurisdictional government agencies and pervasive silo-planning. Malaysian SMEs, for one, are facing increasing policy uncertainties due to a proliferation of agencies involved in each sector.. By 2010, there were about 18 Ministries and 60 government departments dealing with SME development. This situation has led to overlapping roles, functions and responsibilities within an otherwise common governmental architecture [24]. Organizational hydras therefore need to be pruned, grafted and realigned to produce moderate structures that can coevolve, adapt and thrive in a permanently morphing global environment. This approach is in line with the central focus of complexity theory – on structures (e.g. rules, scale, formalization, and connections) that can operate along the “edge of chaos” [25] – the region of complex decision-making situated between chaotic randomness and less-than-innovative regularity.

The Stacey Matrix [26] below illustrates where “complex decision-making” fits in the national policy planning architecture. It is here where an embedded national foresight mechanism can make a crucial difference in the bottom-up decision-making process.

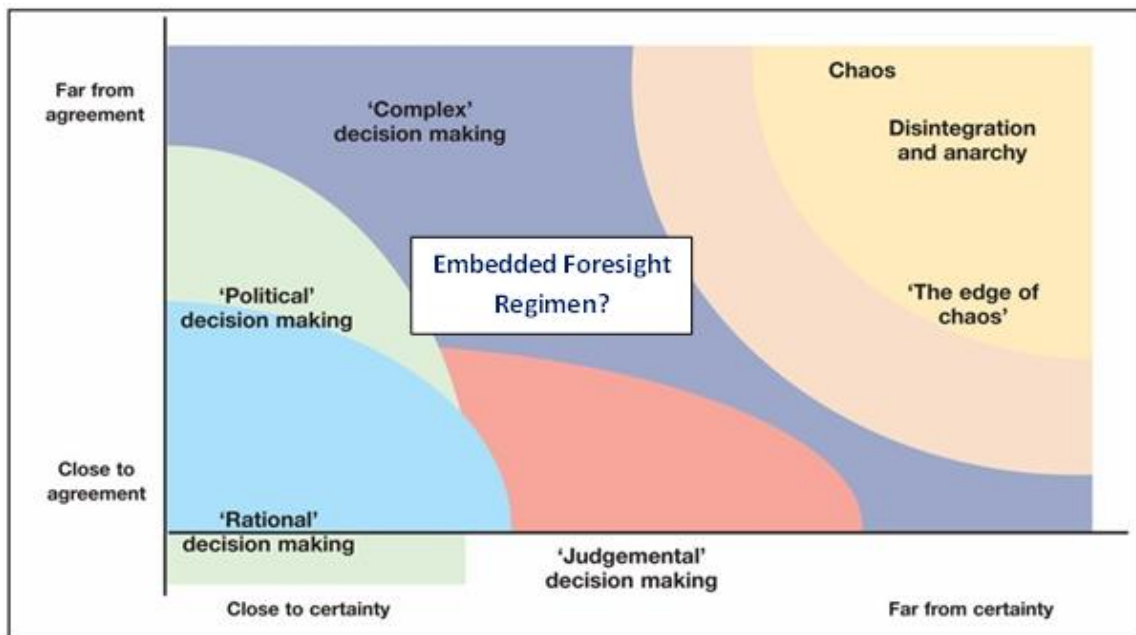


Figure 1: The Stacey Matrix of a Complex Adaptive System

Source: Stacey RD (2002)

## 5. Structural Complexities and Fallouts

Malaysia's Industrial Master Plan Project (IMP), which led to the operationalization of Proton from 1985 onwards, is a showpiece on organizational gridlocks that lead to complexity catastrophes. Proton was structurally bloated from its inception stages, leading to an unwieldy chain-ganging of core operations, ancillary units, subsidiaries and vendor supply networks. Coupled with policy inflexibility, political interference and unrealistic goals, Proton's industrial complex floundered – even to the extent where it could only offer unsold cars in lieu of overdue cash payments to vendors at one point [27].

The on going global economic volatility, precipitated by the Great Recession (Dec 2007 to June 2009), provides an even starker lesson on organizational dystopias. Tight organizational interdependence within the European Union (EU) ironically led to greater volatility instead of initially-envisaged regional stability. The 2010 financial turmoil in Greece induced enough uncertainties over the EU's viability until the June 2016 "Brexit" referendum pressed the need for a more flexible governance structure. Any reform should begin with downsizing the EU's hypertrophic bureaucracy.

Similarly, what began as a sub-prime housing crisis in 2007 in the United States morphed into the Great Recession which, in turn, cascaded into the Arab Spring, the "Arab Winter" as well as on going civil wars in Ukraine and Syria! Structurally chain-ganged global interdependencies lead to equally chain-ganged global chaos. When "complexity catastrophe" turns global, it can be next to impossible to reset the clock.

Organizational dysfunctions do not afflict governments alone; even the paragons of finance seem prone to it. According to the International Monetary Fund (IMF), Deutsche Bank as of mid-2016 posed the greatest systemic risk to the global financial system. Among globally systemically important banks (G-SIBs), Deutsche Bank's total derivatives exposure worth \$72.8 trillion and its high degree of interconnectedness with Allianz, Munich Re, Hannover Re, Deutsche Bank, Commerzbank and A areal banks within the German financial system posed unprecedented levels of transmittable global risks. The IMF added that the German banking system "poses a higher degree of possible outward contagion compared with the risks it poses internally. This means that in the global interconnected game of counterparty dominoes, if Deutsche Bank falls, everyone else will follow" [28]

## 6. Foresight a Complex Adaptive Environment

Within a national policy planning architecture, civil servants who can adapt goals to a constantly changing environment, within the bounds of a moderate organizational structure, tend to generate optimal strategy and outcome. Government planning agencies therefore need to operate under a CAS approach where the patchworks of its constituent units are continually communicating with the external environment. This is ideally achieved by embedding a foresight regimen into the organizational structure. While complexity theory focuses on the scope, nature and internal architectures of an organization, foresight deals with its methods, outcomes and goals – thereby create an ideal synergy.

Moreover, as external environments change, certain constituent units of an organization may become obsolete, necessitating changes like combining, splitting, adding constituent units or reassigning extant units to new focus areas [29]. An embedded foresight regimen therefore enables components of a CAS to communicate via an open innovation approach, creating synergetic and dynamic relationships. This CAS philosophy however leads to a moot question: Should national foresight be centrally guided by a mandated nodal agency i.e. a “national foresight centre” or should a national foresight regimen be flexibly embedded throughout the government architecture? This paper advocates the latter option.

The authors argue that an apex foresight-savvy hierarchy – drawn from various agencies – can be flexibly tasked to oversee national policy planning *in situ* through digital OSINT pathways. Issue-specific expert taskforces can subsequently be created on an ad hoc basis to execute policies and action plans with a far greater degree of flexibility than those dictated by a central foresight agency staffed by personnel who may be unfamiliar with a wide range of subject-related particularities. This way, national policies can be navigated through future uncertainties via a systemically embedded foresight regimen in the government architecture as shown on Figure 2

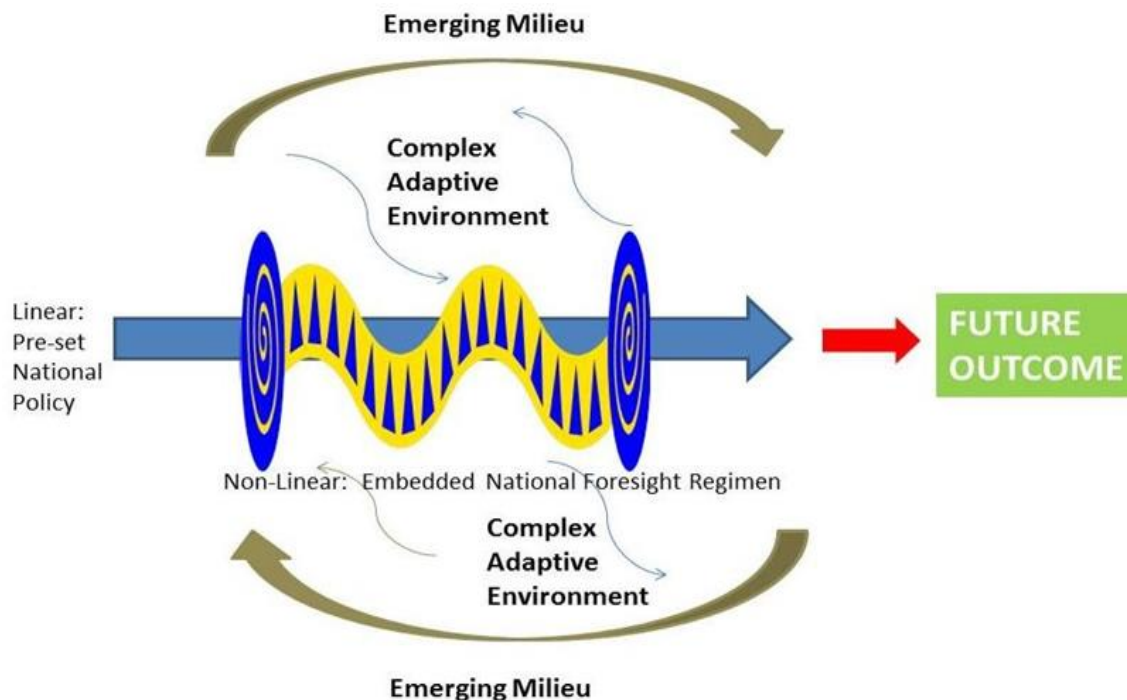


Figure 2: Embedded foresight within a complex adaptive environment

Source: Mathew Maavak (2016)

A decentralized national policy planning architecture is now possible due to revolutions in open source intelligence (OSINT) and Web 2.0 communications. These developments allow moderately-structured national foresight regimens to co-evolve with rapidly-changing internal societal needs and external challenges. As the UNDP points out, the emergent form of anticipatory governance should encourage “civil servants to capture knowledge, share information and practise anticipatory thinking at every level of public administration, from front-line service delivery to top-level decision-making” in addition to inputs from the general public[30]



However, this can only be made possible by adopting the more inclusive and open domain-oriented quadruple helix governance model which places innovation users at the centre of the national policy planning architecture. This will also encourage the development of ideas and innovations that are relevant to the general public. Through the quadruple helix governance model, citizens may effectively own and drive the national innovation process. Active participation of the “general public” is ideally facilitated by a Web 2.0 Open Source Intelligence (OSINT) platform. While Triple Helix networking platforms exist between the government, business and academia, OSINT helps move the fourth helix element– the citizen – into the centre of a nation’s policy-making process[31]. Foresight now becomes embedded, public and open along the national policy architecture. Under this concept, OSINT brings all four helixes or policy-forming elements into the national planning process, leading to greater synergies at the open source level *a la* the open innovation approach recommended by Chesbrough [32]. This ICT-mediated concept is roughly illustrated by Figure 3 below.

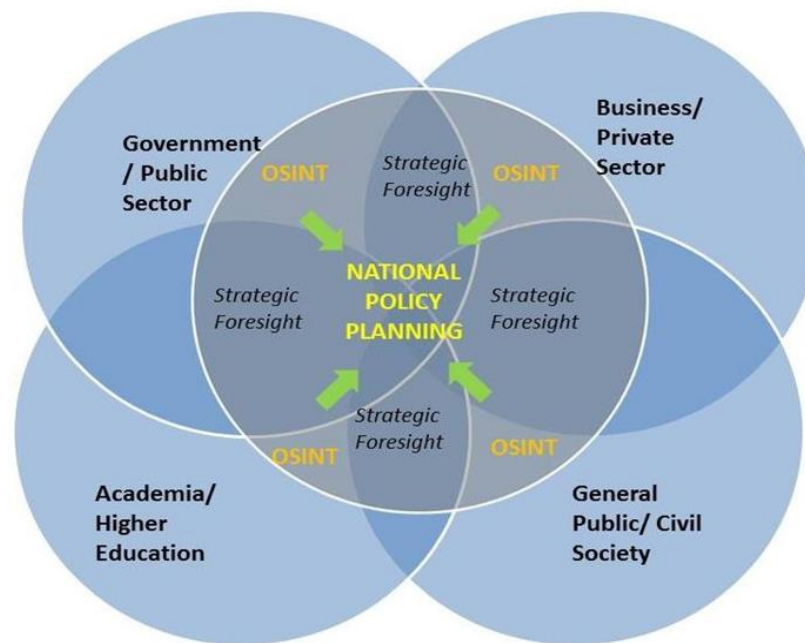


Figure 3: OSINT-Facilitated National Policy Architecture

A net-centric open innovation model – as advocated by this paper – stretches this concept further, with the aim of generating greater value via seamless Web 2.0-based interactions between all four stakeholders in the national policy planning architecture. It adds extra credence to Chesbrough’s arguments on the benefits of collaborating with both internal and external parties [33]. This may happen from the “outside-in” by exploiting external ideas or from the “inside-out” by providing external parties with ideas, knowledge and technology developed within the organisation [34]. The organizationally-embedded foresight regimen is now taking shape.

This approach, also known as open innovation, is gaining traction within many organisations, particularly those involved in the technology sectors. There is a growing emphasis on effective coordination and integration between various organizational activities such as decision-making, marketing, strategic planning, and strategic alliances. In a similar vein, coordination between decision makers and relevant stakeholders is pivotal to national policy implementation.

Since a net-centric open innovation approach draws the public into the decision- making process, it expedites consensus between citizens and decision-makers, narrowing the gulf between them. An OSINT-based open innovation model not only democratises the decision-making process, it becomes an avenue for democratization as well, as citizens are able to deliberate with decision-makers on a level, virtual platform – at least during the embryonic stages of policy formulation.

Organizational super-hydras based on the triple helix model, on the other hand, are intrinsically un-democratic despite their ostensible focus on diversity and other democratic fundamentals. As Smith points out: The EU’s governing body, for example, has become “a mostly faceless and unaccountable bureaucracy that hands down legal dictates from on high while the general population of the member states have little or no input. The very philosophical engine behind the EU is one of collectivism; it is a system that requires a hive mentality in order to function” [35]

## **7. Ensuring Policy Continuity via OSINT-based Foresight**

According to Smith and Cal of [36], foresight “is a set of strategic tools that support government and industry decisions with adequate lead time for societal preparation and strategic response by assessing the external environment.” While certain policies may be inadvisable (i.e. defence and security) for open scrutiny, the pathways needed to actuate overall national goals necessitate inputs from citizens who will be the ultimate users and beneficiaries of various national policy undertakings.

In view of the complexity and evolving nature of national policies which needs to combine elements of foresight, planning, goals and risks, there is neither a clear-cut formula nor an overarching theory for policymaking. Instead, there is a need for continuous adaptation and re-adjustment of policies and related instruments [37]. This calls for “adaptive foresight” [38] or “sustainability foresight” [39] where strategy can be formed at the fundamental, collective and organisational levels.

The future of the Malaysian carmaker Proton, for example, may depend less on the number of vehicles it sells or the latest technological adoption but rather in discovering niche opportunities suggested by consumers at the open source level. In other words, Proton may have to induct consumers as co-designers of its future products. Likewise, governments need to induct citizens into the national policy-making process. It is the contention of this paper that only an embedded foresight regimen in the national policy planning architecture can reconcile social well-being with technology-aided disruptions in the 21<sup>st</sup> century.

Setting long-term policy goals has traditionally posed a number of challenges for governments. Policy challenges are long term, complex and uncertain while in the political context, policy decisions are often short-term, compartmentalised and dominated by advocacy and institutional interests. Such contradiction constricts the introduction of adaptive, long-term perspectives to ever-morphing societal needs. Long-term policymaking may also be disrupted by electoral cycles of between four to five years. A change in government or leadership may entail change in policy priorities. Governments generally focus on short-term gains to maximize voting outcomes in every electoral cycle [40]. This behaviour is exacerbated during an economic slowdown, where the

government of the day is forced to mitigate public disaffection through costly populist means and treasury-draining subsidies for immediate political gains.

Such policy “short-termism” can be resolved by an OSINT-based public participation in the national policy planning architecture. Governments may come and go but inputs and strategies drawn from an operational, open source quadruple helix-based policy paradigm will remain accessible to any incoming political leadership. An open source national foresight process inducted this way can be divorced – to the extent possible – from special interest interference and political fluctuations.

The quality and regularity of OSINT-facilitated public input may also help identify “citizen-technocrats” or uniquely talented individuals who may be co-opted into the national planning process. Such individuals may include typical long-term stakeholders or those who were otherwise consigned to the periphery of the decision-making process. An OSINT-based public participation is particularly relevant in the Malaysian context as it may help generate “native ideas for native problems”, and in the process staunch the on going national brain-drain haemorrhage.

## **8. Time for ‘Anticipatory Governance’**

National development today involves a highly complex interplay between research, finance, infrastructure, education, economics, and government policy –often collectively referred to as “innovation ecology.” [41] Innovation ecology thrives when a permanent foresight mechanism is in place to guide the decision-making process. Foresight’s exploratory thrusts help policymakers think ahead and be prepared for unexpected or unusual developments, leading to forms of “anticipatory governance” that helps strategize development and policy implementation [42]. Anticipatory governance is described as “a system of institutions, rules and norms that provide a way to use foresight for the purpose of reducing risk and to increase the capacity to respond to events at early rather than later stages of their development” [43]. It also involves the incorporation of a degree of complexity science [44]. In the area of development and policy studies, there is a shift towards a complexity awareness approach that favours adaptation as “the way to deal with problems in unpredictable, complex systems. Adaptation works by making small changes, observing the results, and then adjusting” [45].

Anticipatory governance must also involve highly networked stakeholders, leading to a “whole-of-government” (WG) approach that incorporates participative foresight at every level of governance [46]. The WG approach relies on inter-agency collaboration via permeable vertical organisational structures to facilitate learning, communication, analysis and decision-making [47]. This is the only way “grand responses” can be formulated to meet “grand challenges” (e.g. climate challenge, depleting natural resources etc.) to our collective future[48]. Grand responses, by relying on a smart interdisciplinary, multi-stakeholder and policy planning matrix, can create effective innovation-led governance. An embedded foresight regimen in the national policy planning architecture, conceptualized in this study, provides an ideal approach to tackle grand challenges of the future.

## 9. Conclusion

The transformation of a national policy planning architecture is perhaps more challenging than the development of the policy itself. While heads of government agencies may place innovation at the top of their strategic objectives, policies still need to be navigated through long-term time horizons as well as inflexible organizational structures. This paper therefore offers a template for a new, streamlined national policy planning architecture that will co-evolve with an embedded national foresight regimen.

Embedding foresight into the national policy planning architecture generally involves long-term strategic outlook, foresight-centric reappraisal loops, public participation and the ability to co-adapt to a changing environment. “Foresight on innovation policy issues can be interpreted as a systemic co-ordination mechanism that mediates not only between policy actors and different stakeholder communities, but also between different policies (and their respective stakeholders) affecting innovation” [49]. It should also be relevant over longer timelines. Toffler had even recommended the introduction of “how to predict” methods and skills in school classrooms to avoid “future shocks” [50] and “future neurosis” that can paralyze organizations and governments today [51].

To avoid paralyses of government functions, many nations seem to be experimenting with embryonic forms of embedded foresight in their national policy planning architectures. Singapore is a trail-blazer of sorts in this area, reflecting its transformation from a Third World backwater into a highly developed nation within 50-odd years. (South Korea is another example). Even after crossing the developed nation milestone, the Singapore civil service continues to stretch the frontiers of future challenges by adopting the Public Service for the 21st Century (PS21) program. Launched in May 1995, the PS21 is a governance paradigm shift that continually questions the future. Against the backdrop of rapid global changes “the basic tenet of PS21 is accepting the need for change as a permanent state” [52]. Likewise any national policy planning exercise must accept change as a permanent state to meet the complexities and challenges of the future.

Although no authoritative study has yet emerged on the successful embedment of foresight into the national policy planning architecture, the open-source mechanism conceptualized in this paper may hopefully offer a timely template for further scrutiny into the subject. In fact, this concept may soon be operationalized within Malaysia, initially at the university levels, to provide a fillip to the government’s on going rationalization exercise.

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