ENTERPRISE ARCHITECTURE AS PLATFORM FOR CONNECTED GOVERNMENT

Advancing the Whole-of-Government Enterprise Architecture Adoption with Strategic (Systems) Thinking

NUS – Microsoft Government Enterprise Architecture Research Project
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0 INTRODUCTION

0.1 DEFINING ENTERPRISE ARCHITECTURE

Enterprise Architecture is the inherent design and management approach essential for organizational coherence leading to alignment, agility and assurance.

Structured enterprise architecture (EA) approach is often used to plan and implement efficient and effective transformation efforts. However, the strongest driver for EA is to improve service delivery and overall performance within the organization's business segments. The principal challenge faced by chief architects today is to institute an EA program that is able to coordinate sustainable changes throughout the enterprise, while simultaneously mentoring the specific transformation planning that is needed to support the mission.

In a nutshell, EA is a robust planning function which helps organizations to understand the process by which business strategies turn into operational reality. Hence, establishing a standard methodology for conducting architecture planning and implementation is vital. Metaphorically, an EA is to an organization’s operations and systems as a set of blueprints is to a city and its buildings. Traditionally, by following an architecture-based approach to systems development, organizations strive to address issues pertaining to: (1) business–IT alignment; (2) information accuracy and integrity; (3) infrastructure management; (4) security; (5) technology compatibility; (6) business value of IT; (7) IT governance; (8) business collaboration; and (8) procurement among others. Though EA is often assumed to follow an organization’s strategy and to align IT with business objectives, increasingly, evidence of the reverse is also surfacing. In other words, organization strategies are being influenced by IT capabilities.

At a high-level, EA consists of a hierarchy of architectural domains that can be loosely associated with full EA delivery, as:

- The business architecture, which defines the enterprise business outcomes, functions, capabilities and end-to-end business processes, and their relationships to external entities required to execute business strategies;

- The data / information architecture, which deals with the structure and utility of information within the organization, and its alignment with its strategic, tactical and operational needs;

- The application architecture, which specifies the structure of individual systems based on defined technology; and

- The technical architecture, which defines the technology environment and infrastructure in which all IT systems operate.

The above four domains largely represent the current state of practice in the discipline of EA. In their book Coherency Management–Architecting the Enterprise for Alignment, Agility and Assurance, authors Doucet, Gotze, Saha and Bernard present and discuss the extended and embedded modes of EA in addition to the traditional mode. They assert that as

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1 Source: Coherency Management – Architecting the Enterprise for Alignment, Agility and Assurance; Gary Doucet, John Gotze, Pallab Saha & Scott Bernard; 2009.
organization start embracing the more advanced extended and embedded modes, the need for synergy and consistency amplifies, thus facilitating the attainment of organizational coherence, the ultimate goal of EA. Successful EA not only captures the above four domains, but also the relationships between them. Having linkages between the four domains provides line-of-sight (or traceability) to the relevant stakeholders of the EA. Exhibit 0-1 depicts how EA is usually positioned within the organization. It is important to remember that keeping EA linked upstream to strategic management and downstream to portfolio management and system development lifecycle provides an effective approach to business transformation. It thus allows for a complete lifecycle approach to business transformation.

Exhibit 0-1: Enterprise Lifecycle with Architecture

EA effectively supports the business, enables information sharing across departments / divisions / organizations, enhances management’s ability to deliver effective and timely services and improves operational efficiencies. Committing to an on-going EA practice within an enterprise enables a business-aligned and technology-adaptive enterprise that is effective efficient and agile.

0.2 WHY ENTERPRISE ARCHITECTURE MATTERS IN GOVERNMENT

Most governments worldwide are in the midst of substantial public sector transformation activities. A majority of these initiatives are triggered by the need to have better and seamless government services delivered online. The focus on automating government services often is largely limited to specific ministries and agencies. However, such initiatives
lack the cross-ministry / agency viewpoint and coordination. This creates challenges in taking a Whole-of-Government (W-O-G) approach with its concomitant benefits, which are much more than benefits derived by taking agency-centric viewpoints. These shortcomings are clearly evident in the findings of the UN Global E-Government Survey 2010. According to the UN, the value of e-government will be increasingly defined by its contribution to national development. Lack of coherent strategy is often cited as the primary reason for under-development of e-government. Moving forward, more and more countries are adopting national e-government strategies and multi-year action plans, and EA is the strategy that governments are increasingly looking toward. According to Haiyan Qian, Director of the Division for Public Administration and Development Management, United Nations Department of Economic and Social Affairs (UNSDA), “EA is an effective strategic planning tool for governments by [facilitating] creation of linkages and improving interoperability among government agencies, benefiting both internal operational processes as well as improved public service delivery to citizens.”

0.2.1 Understanding Connected Government

| Connected government enables governments to connect seamlessly across functions, agencies and jurisdictions to deliver effective and efficient services to citizens and businesses. |

The United Nations (UN), in its Global E-Government Survey of 2008, used connected governance as its primary criteria by which to evaluate and rank national e-government programs. According to the survey report, the concept of connected government is derived from the W-O-G approach which utilizes technology as a strategic tool and enabler for public service innovation and productivity growth, the two key outcomes being innovation and productivity. In continuation of this theme, the UN Global E-Government Survey of 2010 takes the concept of connected government even further, adding “citizen-centricity” as the watchword. This approach to government service delivery requires countries to shift from a model of providing government services via traditional modes to integrated electronic modes wherein the value to the citizens and businesses gets enhanced. According to the UN, such IT-enabled services (e-services) can actually improve the rate and quality of public service delivery in times of economic crises.

Thus IT-enabled connected government, of which e-services are a crucial component, leads to several benefits, both internally to the provider agencies and governments, and externally to the consumer citizens and businesses. Exhibit 0-2 lists the benefits:

<table>
<thead>
<tr>
<th>Benefits from IT-Enabled Connected Government</th>
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<tbody>
<tr>
<td><strong>Internal</strong> (To Provider Agencies and Governments)</td>
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<tr>
<td>1. Avoidance of duplication</td>
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<tr>
<td>2. Reduction in transaction costs</td>
</tr>
<tr>
<td>3. Simplified bureaucratic procedures</td>
</tr>
<tr>
<td>4. Greater efficiencies</td>
</tr>
<tr>
<td>5. Richer communication &amp; coordination</td>
</tr>
<tr>
<td>7. Greater information sharing</td>
</tr>
<tr>
<td>8. Secure information management</td>
</tr>
</tbody>
</table>

Exhibit 0-2: Benefits from IT-Enabled Connected Government
Government transformation is a long term endeavor that is seldom impacted by any short term technology trends. In their transition toward connected government, all governments typically traverse through the four primary stages of e-government capability and maturity, each stage representing a progressively higher level in the government transformation continuum. The four widely used stages of e-government capability and maturity are; web-presence, interaction, transaction and transformation. Furthermore, connected government is the desired state that countries strive to reach as part of the transformation level of e-government maturity. However, there is no straightforward way to describe what exactly connected government means and its implications to countries.

Based on the current state of practice and available literature, connected government is expected to entail certain characteristics and capabilities. These characteristics and capabilities, described below, are clearly stated to be the key contributors to e-government development according to the UN E-Government Survey 2010, and in turn contribute to national development. These characteristics and capabilities, structured as dimensions, allow connected government to be viewed as a multi-dimensional construct. The dimensions of connected government are:

- **Citizen centricity:** This refers to viewing the governments from the outside in, i.e. understanding the requirements and expectations of the citizens becomes the pre-eminent guiding principle for all government policies, programs and services. In short, this represents the service-dominant logic which requires the governments to operate as one enterprise and organize itself around citizen demands and requirements. Aside from the citizens per se, other government constituents, such as businesses and civil organizations, are captured in the social inclusion dimension described later;

- **Common infrastructure and interoperability:** This refers to the use of standards and best practices across governments so as to encourage and enable sharing of information in a seamless manner. Interoperability is the ability of organizations to share information and knowledge within and across organizational boundaries. The underlying foundation for effective interoperability comes from standardized common infrastructure;

- **Collaborative services and business operations:** Connected government requires ministries and agencies to collaborate. It is not difficult to uncover success stories about integration and interoperability at the technology level. However, to collaborate at the level of business services and functions requires political will. This is because collaboration at this level leads to shallower stovepipes, elimination of redundant or overlapping services and discovery of common and shared services, which in turn lead to loss of authority and control for some;

- **Public sector governance:** This refers to the decision rights and the accountability framework required for implementing all the other strategies for connected government. Good governance is a non-negotiable factor in the success of connected government, more so for countries that have multiple levels of governments (i.e. federal / central; state / provincial; and town / city) where various levels could be administered by different political parties;

- **Networked organizational model:** As Theresa Pardo and Brian Burke discuss in their work on government interoperability, this refers to the need to accommodate new organizational models wherein the enterprise (in this context the whole of government) is a network of relatively autonomous ministries and agencies working in a coherent manner to deliver value to both citizens and businesses. This makes
the whole-of-government a networked virtual organization (NVO) that operates seamlessly toward a common mission.

- **Social inclusion:** This refers to the ability of governments to move beyond horizontal and vertical integration of government service delivery to engaging the citizens and businesses at relevant points in the policy and decision making processes. E-democracy and social inclusion ensure that delivery of government services is not a one-way exchange. Innovative ways of using technology to facilitate constituent participation and building a consultative approach is imperative for the success of connected government; and

- **Transparent and open government:** This refers to the political doctrine which holds that the business of government and state administration should be opened at all levels to effective public scrutiny and oversight. In its broadest construction it opposes reason of state and national security considerations, which have tended to legitimize extensive state secrecy.

The levers that contribute to performance along the dimensions are presented in Section 0.4 of this report. In addition, connected government is expanded to include four evolutionary stages, described in Section 2 of this report. Together, they allow much greater clarity and granularity in the description, role, structure and implications of connected government that so many countries are seeking to achieve.

### 0.2.2 Role of Government Enterprise Architecture

According to the UN, moving to connected government requires a holistic and coherent framework, which cannot be achieved by piecemeal approaches and mechanisms. Such a framework recognizes the integrated presence of e-government both as an internal driver of transformation within the public sector and an external driver of better governance.

Typically governments are the largest organizations. They are further characterized by complex federated structures where individual government organizations work in their respective silos. This often leads to fragmented business processes and duplicated systems and technologies, creating obstacles in cross agency interoperability. Government-wide architecture allows end-to-end business processes, standard technologies, rationalized data structure and modularized e-services that can be assembled as required to deliver e-services.

EA is a critical success factor for all types, scale and intensities of e-government programs. The key goal of EA in government organizations is to make them citizen-centered, results-oriented and market-based. Governments usually pass through different evolutionary stages in their EA journeys. The MIT Center for Information Systems Research identifies four such evolutionary stages: **business silos, standardized technology, rationalized data and applications** and **business modularity**. Even though standardization of technology is strictly not a prerequisite, it is a valid entry point into the EA journey for many countries. The primary reasons being: (1) EA programs are largely driven by the CIO / IT Department, hence they have maximum control over the technology infrastructure; (2) this is an area where tangible benefits can be demonstrated fairly quickly. These two reasons make technology standardization an attractive entry point, even though countries (and governments) must move beyond this to other stages of EA evolution to derive full benefits. However, the caveat is that transitioning to higher levels of evolution requires greater involvement of a broad range of stakeholders and government constituents.
Interestingly, there exists a positive correlation between the desired level of e-government capability and maturity and the required level of architectural maturity. Exhibit 0-3 depicts this relationship, from which the ability to build and manage advanced government EA is a necessary prerequisite for countries to elevate to higher levels of e-government maturity and capability.

<table>
<thead>
<tr>
<th>E-Government Maturity Stages</th>
<th>Government EA Maturity Stages</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Business Silos</td>
</tr>
<tr>
<td>1. Web Presence</td>
<td>√</td>
</tr>
<tr>
<td>2. Interaction</td>
<td>√</td>
</tr>
<tr>
<td>3. Transaction</td>
<td>√</td>
</tr>
<tr>
<td>4. Transformation (Connected Government)</td>
<td>√</td>
</tr>
</tbody>
</table>

Exhibit 0-3: High Level Relationship of Government EA and E-Government Maturity

0.3 ABOUT THE RESEARCH

Sections 0.1 and 0.2 are intended to provide a general overview about the key components of this research, namely, enterprise architecture, e-government (connected government) and the relationship between the two.

Connected government as a goal is gaining acceptance and popularity. This is demonstrated by various e-government surveys that are conducted regularly by different organizations including the UN. The expanding role of EA as a central component for e-government programs is substantiated by the fact that several countries have taken a legislative approach to embracing and adopting EA. Furthermore, there have been several EA surveys conducted in the past few years. Hence, individually (e-government and EA) are well understood, richly documented and regularly assessed and researched.

This research addresses the gap in current literature in terms of linking and understanding the relationship between e-government and government EA. Within this broader context, the focus is specifically on uncovering and comprehending the relationship between government EA and connected government. The primary reason for focusing on connected government is that it is the area where government EA has the highest potential for influence and as a result the highest levels of benefits derivation.

In summary, the aim is to address the questions “can enterprise architecture act as a platform for connected government?” and “what will it take for enterprise architecture to do so?” substantiating any claims with empirical evidence.

0.3.1 Objectives

This research aims to:

A. Identify and develop the dimensions of connected government and position it as a multi-dimensional construct.

B. Specify the levers that positively influence the various dimensions of connected government.
C. Understand the role of enterprise architecture (either as facilitator or inhibitor) in achieving connected government.

D. Identify the enterprise architecture capabilities and structure them as a meta-framework to act as a positive factor to connected government.

E. Document case studies and experience reports of successful use of enterprise architecture in transitioning to some or all stages of connected government.

0.3.2 Structure of the Research

This work is organized into four logically sequenced phases. Collectively, the four phases address all the above research objectives.

- **Phase 1:** Phase 1 report documents the part of the research that focuses primarily on Objective A and establishes the context and background for Objectives B, C and D;

- **Phase 2:** Phase 2 report (this report) documents the part of the research that focuses primarily on Objectives B and C;

- **Phase 3:** Phase 3 report documents the part of the research that focuses primarily on Objective D; and

- **Phase 4:** Phase 4 report documents the part of the research that focuses primarily on Objective E. In addition, this report also integrates and summarizes the findings across the four phases.

0.4 ASSESSMENT FRAMEWORK

In order to study and analyze government EA frameworks and associated activities, an assessment framework has been established and utilized for the rest of the study. In alignment with the research objectives delineated in Section 0.3.1, the Enterprise Architecture Assessment Framework for Connected Government (EAAF-CG) is based on the dimensions of connected government presented in Section 0.2.1. Exhibit 0-4 summarizes the established assessment framework along with the dimensions and levers. Connected government is systemic in nature. This makes the relationships between dimensions and levers causal and mutually reinforcing among and between themselves by design.

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td><strong>Dimensions of Connected Government</strong></td>
<td><strong>A.</strong> Citizen requirements &amp; expectations</td>
</tr>
<tr>
<td><strong>1. Citizen Centricity</strong></td>
<td><strong>B.</strong> Government appears and operates as one</td>
</tr>
<tr>
<td><strong>2. Common Infrastructure &amp; Interoperability</strong></td>
<td><strong>C.</strong> Multiple channels of engagement</td>
</tr>
<tr>
<td><strong>3. Collaborative Services &amp; Business Operations</strong></td>
<td><strong>D.</strong> Adaptability of government services</td>
</tr>
<tr>
<td><strong>4. Public Sector Governance</strong></td>
<td><strong>A.</strong> Technology standards</td>
</tr>
<tr>
<td><strong>B.</strong> Government-wide applications &amp; systems</td>
<td><strong>C.</strong> Data exchange standards</td>
</tr>
<tr>
<td><strong>C.</strong> ICT &amp; infrastructure management</td>
<td><strong>D.</strong> Service innovation &amp; back office reorganization</td>
</tr>
<tr>
<td></td>
<td></td>
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</tbody>
</table>
### Enterprise Architecture Assessment Framework for Connected Government

<table>
<thead>
<tr>
<th>Dimensions of Connected Government</th>
<th>Levers to Connected Government Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Networked Organizational Model</td>
<td>A. Multi-stakeholder cooperation</td>
</tr>
<tr>
<td></td>
<td>B. Ministry / agency and government level autonomy</td>
</tr>
<tr>
<td></td>
<td>C. Cluster based approach &amp; common mission</td>
</tr>
<tr>
<td></td>
<td>D. Value network</td>
</tr>
<tr>
<td>6. Social Inclusion</td>
<td>A. Citizen engagement at various levels</td>
</tr>
<tr>
<td></td>
<td>B. Citizen outreach</td>
</tr>
<tr>
<td></td>
<td>C. Responsive government</td>
</tr>
<tr>
<td>7. Transparent &amp; Open Government</td>
<td>A. Public scrutiny &amp; oversight</td>
</tr>
<tr>
<td></td>
<td>B. Data discovery, availability &amp; accessibility</td>
</tr>
<tr>
<td></td>
<td>C. Performance management &amp; accountability</td>
</tr>
<tr>
<td></td>
<td>D. Legal Framework(s)</td>
</tr>
</tbody>
</table>

| Exhibit 0-4: Enterprise Architecture Assessment Framework for Connected Government |

### 0.5 SUMMARY OF PHASE 1 STUDY

The Phase 1 report “Understanding the Impact of Enterprise Architecture on Connected Government - A Qualitative Analysis” establishes several critical concepts and findings. It sets the context. A summary of these findings are listed below.

A. Connected government remains a favored and much desired goal for national governments, the impetus further coming from the periodic e-government surveys conducted by the UN and various other organizations. The four evolutionary stages of connected government are:

- **Intragovernmental**: Connectedness among and between government ministries and agencies that usually leads to the whole-of-government perspective and being viewed as a single virtual and networked enterprise. This also includes interactions and coherency at multiple layers of government (national, state, provincial, district, city);

- **Intergovernmental**: This is connectedness between sovereign nations driven by common and shared goals and objectives on issues that have multi-country or global repercussions (examples include law enforcement, customs, counter-terrorism, health, intellectual property, free trade agreements, etc.);

- **Extragovernmental**: This refers to the connectedness between government and associated business organizations and partners outside of the government. This type of connectedness allows the creation of services that may be planned and delivered in collaboration with non-governmental entities, seamlessly integrated and usually leading to service ecosystems; and

- **Ubiquitous**: This refers to connectedness that facilitates multi-dimensional multi-channel pervasive communication between all stakeholders (but focusing more on citizens) by way of participation, engagement, openness, government transparency and accountability. In some literature these are the goals of Government 2.0. This is the stage wherein government itself acts as a platform and coherency is imperative as connectedness is fully diffused, comprehensive and encompasses the emotional aspects as well.
B. As part of the e-government lexicon, government EA: (1) has attained the status of mainstream activity and is gaining further traction; (2) is a precondition for successful implementation of connected government; (3) is challenging and sometimes intimidating to countries who do not yet have adequate prerequisites; (4) provides a structured and disciplined approach to converge several technology and management centric activities; (5) facilitates the move toward value network as the primary value configuration; and (6) requires enhancements in the way it is designed, developed, portrayed, managed and utilized to provide the necessary impetus for countries to move toward connected government.

C. Many e-government initiatives fall short of their goals as a result of being conceptualized and implemented in a piecemeal manner rather than comprehensively and from a whole-of-government perspective. The stove piped approach is ingrained in the financial structures, intervention designs, policies and evaluation methods. Government EA offers the potential to act as the meta-discipline that provides mechanisms to holistically understand the enterprise in question (i.e. governments) and link and optimize disparate activities and approaches into a single unified coherent program.

D. The challenge is to view governments as complex and dynamic systems and, in order to support the whole-of-government paradigm, embrace systems-thinking. This is an imperative as systems thinking provides new vantage points and new perspectives.
1 SYSTEMS THINKING FOR THE BUSINESS OF GOVERNMENT

Government EA has gained the center stage as an essential discipline to enable and even drive government transformation. To be considered as the “architecture of the enterprise”, it is thus an imperative to understand the enterprise that is to be architected, an understanding that permeates the entire enterprise. Yet, all current government EA activities focus entirely on the operational aspects, completely ignoring the more important strategic aspects. In order for government leaders and policy makers to comprehend the role and intended outcomes from government EA programs, it is imperative that they view such programs from a strategic viewpoint in the way these are planned, designed, embraced, managed and governed. It would be an understatement to say that enterprises are complex. Going a step further, governments are even more complex and at times paradoxical. This stems from the fact that governments are by far the largest enterprises and with size comes complexity. Complexities in governments are of both types—combinatorial complexity and dynamic complexity. Complexity arising due to sheer number of components and elements that are interconnected refers to combinatorial complexity. Dynamic complexity, on the other hand, arises due to the velocity of change and the quantum of interactions between the components and elements. In addition, unpredictable delays between decisions and their effects (and counter-effects) completes the picture of what constitute, according to Gartner, “wicked problems”. In short, governments are excellent examples of complex dynamic systems.

A system is defined as a set of interrelated things encompassed by a well defined and permeable boundary, interacting with one another and an external environment, forming a complex but unitary whole and working toward a common overall goal.

Governments around the world are facing several challenges (wicked problems) and are under pressure to address these challenges in more open, accountable and transparent ways from active and vocal citizens and businesses alike. In order for governments to transform, it is critical that they are understood and, as complex dynamic systems governments, exhibit the following characteristics:

<table>
<thead>
<tr>
<th>Common Characteristics of Complex Dynamic Systems (Governments)</th>
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</thead>
<tbody>
<tr>
<td>1. Constantly changing</td>
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<tr>
<td>2. Tightly coupled</td>
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<tr>
<td>3. Governed by feedback</td>
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<tr>
<td>4. Non-linear</td>
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<tr>
<td>5. History dependent</td>
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<tr>
<td>6. Self-organizing</td>
</tr>
<tr>
<td>7. Adaptive</td>
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<tr>
<td>8. Counterintuitive</td>
</tr>
<tr>
<td>9. Policy resistant</td>
</tr>
<tr>
<td>10. Trade-off dependent</td>
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Exhibit 1-1: Characteristics of Complex Dynamic Systems (Governments)

Enterprises (in this case governments) characterized by the above, require much more than conventional thinking in order to understand the underlying system and the challenges that the system faces. The success of government transformation programs thus becomes dependent on comprehending the underlying system. Ambiguity in understanding the system is one of the primary reasons for public sector transformation showing less than satisfactory results and success rates. It is amply evident that countries are adopting Whole-of-Government (W-O-G) EA as the meta-discipline to trigger, design and realize government transformation. However, in the past decade or so the focus of W-O-G EA programs have been on developing frameworks, methodologies, languages, guidelines, best practices, reference architectures and other capacity building activities. This is evident in the surveys.
done and presented in the Phase 1 report of this research. Despite all these seemingly impressive efforts, the adoption of W-O-G EA has been less than impressive. This is evidenced by Gartner’s **Hype Cycle for Government Transformation 2009**, wherein W-O-G EA would require another 5 to 10 years before reaching full maturity and delivering benefits justifying its immense potential. On the upside, however, Gartner’s **Hype Cycle for Enterprise Architecture 2010** does state that W-O-G EA is past the bottom of the trough of disillusionment. There is no dearth of literature and other enabling resources for countries to build their enterprise architectures. Yet, after the initial enthusiasm, things are difficult to sustain with questions often being raised regarding the efficacy of government EA efforts. This is not surprising at all. EA efforts in the past decade or so have concentrated on building what could be termed as **solutions** to the EA problems. As it is evident from the Phase 1 report of this research, nearly all EA efforts currently focus on building frameworks, methodologies, guidelines, principles, best-practices and tool support. Without fully understanding the underlying system, the success achieved through the above has been limited. This leads to two logically explainable reactions: (1) frantic efforts to improve the frameworks, methodologies, guidelines, principles, best-practices and tool support; and (2) discontinuing the W-O-G EA altogether by terming it “too difficult” and “too complex”.

**The need of the moment is not better solutions, but better thinking about the problems.** Gary Hamel in his book *The Future of Management* states that solving a systemic problem requires understanding its systemic roots is the first of the 10 rules for management innovation. It is in this context that conventional open-loop thinking to solving business problems needs to be replaced with systems (closed-loop) holistic thinking. A systemic perspective is used to understand how the numerous components of the governments act, react and interact with one another with the intent of improving the adoption of W-O-G EA for connected government. This provides a comprehensive, holistic and a more coherent way of anticipating synergies and mitigating negative emergent behaviors, which would facilitate development of policies and other relevant intervention mechanisms. Using a systemic perspective encourages strategic thinking. Exhibit 1-2 shows a comparison of systems thinking over conventional thinking.

<table>
<thead>
<tr>
<th>Comparing Conventional and Systems Thinking</th>
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<tbody>
<tr>
<td>Conventional (Open-Loop) Thinking</td>
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<tr>
<td><strong>Static thinking</strong></td>
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<tr>
<td>Focusing on particular events.</td>
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<tr>
<td><strong>Systems-as-effect</strong></td>
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<tr>
<td>Viewing behavior generated by a system as driven by external forces.</td>
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<tr>
<td><strong>Fragmented</strong></td>
</tr>
<tr>
<td>Believing that really knowing something means focusing on the details.</td>
</tr>
<tr>
<td><strong>Factors thinking</strong></td>
</tr>
<tr>
<td>Listing factors that influence or correlate with some results.</td>
</tr>
<tr>
<td><strong>Straight-line thinking</strong></td>
</tr>
<tr>
<td>Viewing causality as running in one direction, ignoring the interdependence and interaction between and among the causes.</td>
</tr>
</tbody>
</table>

**Exhibit 1-2: Comparing Conventional and Systems Thinking**
This report uses causal-loop diagrams to capture non-linear cause and effect relationships in order to realize the systems thinking described earlier. The conventions of causal-loop diagrams are not described here, as excellent literature is already available in this area. Unfortunately, the same cannot be said about the reasons for less than optimal adoption of W-O-G EA by many countries. Gartner’s *Hype Cycle for Enterprise Architecture 2010* clearly states that W-O-G EA is currently immature and is still 5 to 10 years from attaining full maturity and adoption. It does not provide the reasons for the current state and what needs to be done to address this “wicked problem” in the context of connected government (i.e. government transformation). With the primary aim of advancing the adoption of W-O-G EA for connected government, there is a clear need to: (1) uncover the critical influencing factors; (2) identify the relationships between and among the factors; (3) recognize the underlying dynamics; (4) propose plausible intervention strategies to address the situation.

It can be mentioned with a high degree of confidence that the systems thinking approach presents the highest potential to view W-O-G EA adoption from a holistic perspective, which also happens to be a major gap in the current literature.

The outputs from this phase of the research are intended to provide critical inputs for the development of the proposed Government EA meta-framework in the subsequent phases.
2 SYSTEMS MODELING FOR W-O-G EA ADOPTION

Governments around the world are under increasing pressure to demonstrate their performance to all key stakeholders. They are at times being expected to do things that have very little precedence. Business models and technologies are changing rapidly and stakeholders expect governments to embrace these changes even more quickly. This puts unprecedented pressure on the governments not only to focus on efficiency, but also remain effective and agile. The current economic and geo-political situation exacerbates the need to perform and deliver even further as citizens are demanding (not merely expecting) performing governments.

2.1 THE TRANSFORMATION IMPERATIVE

According to the UN, many governments are experiencing transformative power in revitalizing public administration, overhauling public management, fostering inclusive leadership and moving civil service toward higher efficiency, transparency and accountability. Countries recognize the increasingly central role e-government will play in reaching these goals. There are example abounds of the positive influence of high performing governments on the overall national development of countries and in turn the size of their economies itself. It is fairly straightforward to state that countries with growing economies (rising GDP) tend to be more complex simply because expectations from these governments are higher and as a result such governments tend to provide greater number of (and more complex) services. As government services permeate more into the economy (i.e. more and more constituents use these services) they without fail become complex and dynamic as governments are forced to cater to a wide range of needs, wants, expectations, and aspirations. This increases the pressure on the governments to organize their services as there arises the need to: (1) change the way services are delivered and consumed; (2) change the way internal back office operations are executed; and (3) change the way resources and processes are sourced and combined. The role of enabling policies in making this happen cannot be overstated. It is in this context that governments are looking at e-government (and technology) to bridge the policies and outcomes, leading to even more government services that are offered electronically. These factors are all inter-related in a single reinforcing loop that forms the trigger for government-wide transformation. This is depicted in Exhibit 2-1 in the variables 1 through to 9 combining to form the reinforcing loop (R1: complexity triggered transformation).

![Exhibit 2-1: Complexity Triggered Government Transformation](image-url)
2.2 ICT CAPABILITY AND INDUSTRY DEVELOPMENT

Information and communication technology (ICT) is increasingly a central part of national competitiveness strategies and plays a key enabler of socio-economic progress and development, productivity enhancement, modernization, economic growth and even poverty reduction. The reinforcing loop R1 described in Section 2.1 creates the initial trigger for governments to embrace ICT-enabled transformation. A positive influence of this is that the pressure to transition to e-government also creates pressure to improve the overall e-government maturity. A capable and mature e-government allows countries to showcase their achievements and this is further fuelled by the several e-government surveys and rankings that are currently in use. An interesting downstream impact of high e-government capability is that it directly impacts the overall national ICT capability. In other words, a country’s e-government focus and capability provides the raw material to improve its overall national ICT capability by way of resources, talented and trained people, investments, research and development expertise, supporting policies and governance among other enabling inputs.

Greater national ICT capabilities provide the necessary fodder to the emergence of national ICT industry. There are several countries who have utilized their foray into e-government as an entry point to build their national ICT industries, notable among them being South Korea, Singapore, Taiwan, Turkey, Malaysia, Egypt, South Africa and Brazil. Several other countries like Bahrain, Oman, Vietnam, United Arab Emirates, Philippines and Macau are also in the process of attempting the same. The above list of countries is only indicative of the diffusion of this approach. A common underlying element in all these countries is that the national e-government and ICT strategy typically is derived from the national ICT plans where the primary focus is increasing the ICT penetration. An example is Singapore, wherein the national e-government plan (iGOV 2015, the current one) is derived from the national ICT plan called the iN2015. An interesting observable phenomenon is that the national ICT industry matures; it also facilitates the joint delivery of selected e-government services in the public-private partnership (PPP) mode based on business needs.

The impact of national ICT industries on the overall economy and GDP is immense, albeit sometimes it takes time to fully realize the potential. According to the World Economic Forum “a fluid and ever-changing ICT touches nearly every industry sector with innovative, personalized and efficient solutions”. As an example, Exhibit 2-2 shows South Korea’s past, present and future impact of ICT industry and its contribution to the national economy.

The World Bank’s Global Economic Prospects 2008 – Technology Diffusion in the Developing World further substantiates the link between the technology diffusion and its impact of the national economies. In short, technology is both a critical determinant and an outcome of rising national incomes. These factors and their impacts are captured as two reinforcing loops (R2: capability multiplier) and (R3: IT industry in motion). The variables covered include 9, 10, 11, 18, and 19 which in turn feeds into variable 2 further reinforcing the loop R1. These are depicted in Exhibit 2-3.

2.3 ICT ADOPTION AND SAVVINESS

The highly inter-connected and inter-dependent reinforcing loops R1, R2 and R3, if utilized correctly, provide tremendous momentum for countries to embrace e-government and make use of them for government modernization and transformation, enhancement of national ICT capability and even development of the national ICT industry, each feeding into the other and growing stronger. Countries have understood these dynamics and used it to their advantage. The positive churn that loops R1, R2 and R3 create is further instrumental in creating and sustaining another reinforcing loop that allows countries to be power-consumers of ICT.

As the national ICT industry matures (discussed in Section 2.2), an ecosystem is created. This facilitates the adoption of ICT both across the government and the private sector organizations. Knowledge about ICT and its capabilities makes organizations ICT savvy, i.e. they develop the ability to utilize ICT to address business issues and ICT becomes an integral part of the overall government and corporate strategy. Such organizations are able to balance supply-side leadership along with demand-side leadership by adopting advanced practices and techniques such as portfolio management, ICT strategic planning, risk management, business continuity planning and ICT service management among several others. These in turn augment their ability to embrace new technologies quickly as it allows them to be on the “leading edge”, even though, as experience has shown, this may not
always be the best strategy. The **World Economic Forum's Global Information Technology Report of 2009** provides an excellent example of this phenomenon of ICT diffusion and leverage. In short, ICT readiness facilitates ICT adoption and usage. Countries that demonstrate a high degree of ICT diffusion and leverage usually tend to have the position of Government Chief Information Officer (GCIO) and similar roles across the government. This is indicative of the seriousness that is lent to ICT. Interestingly, a majority of these organizations also tend to pressurize their vendors to deliver and deploy the latest technologies, some of which may not even have been field proven. The chase to embrace and showcase new technologies, gives rise to several projects largely unrelated, examples of which include next generation broadband, cloud computing, and green ICT among others, which in turn feeds to encourage the development of technology silos. This will be discussed further in subsequent sections. The reinforcing loop (R4: Technology adoption and usage maturity) consisting of new variables 19, 20, 21, 22 and 23 is shown in Exhibit 2-4.

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**Exhibit 2-4: Impact on ICT Diffusion and Leverage**

The discussions above have identified four reinforcing loops: R1, R2, R3 and R4, wherein the key points are as below:

**A.** According to John Zachman, the two primary reasons for organizations to embrace EA as a disciplined approach to planning and implementation are management of complexity and change. Loop R1 is in line with this. Countries use e-government as a way to trigger and sustain government transformation. As shown in the UN E-government maturity levels, transformation (i.e. achievement of connected government) is highest level and is much more than mere automation of government services.

**B.** Government modernization and transformation positively influences e-government capability, leading to more mature national ICT capability, which in turn plays a critical role in the emergence of the national ICT industry, captured through loops R2 and R3.
C. Aside from the supply-side viewpoint captured in loops R1, R2 and R3, these factors also provide a positive momentum to the demand-side i.e. ICT diffusion and leverage, captured in loop R4.

Exhibit 2-5 depicts the interactions between the ICT supply and demand sides, by highlighting the impact of ICT propagating through the economy to foster growth, employment and innovation.

<table>
<thead>
<tr>
<th>Measures fostering demand for ICTs</th>
<th>ICT industry and supply side</th>
<th>Non-ICT industry and demand-side</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supporting infrastructure investment, either in unserved or underserved areas or fostering next-generation networks</td>
<td>Upgrading ICT infrastructure in schools, public sector, healthcare, research, education, etc.</td>
<td>Introducing “smart” and “green” ICT-related infrastructure (e.g. health IT, smart grid)</td>
</tr>
<tr>
<td>Immediate positive revenue impact for communication companies and equipment vendors and others involved in the deployment of infrastructure</td>
<td>Creates demand for ICT industry products and services feeding into ICT sector revenues and employment</td>
<td>Rise of new specialised hardware, service and consultancy providers (smart grid, health IT, etc.)</td>
</tr>
<tr>
<td>Preservation and creation of jobs for infrastructure deployment. Workers continue to spend money in other sectors</td>
<td>Preservation &amp; creation of ICT technical and related jobs in other sectors</td>
<td></td>
</tr>
</tbody>
</table>

Exhibit 2-5: ICT and its Role and Impact in National Economy (Source: OECD)

It is not difficult to understand that countries would typically go through several cycles of loops R1 to R4 connected as a group of virtuous spirals, in the process advancing their e-government maturity. It has already be established and validated in the Phase 1 report that transitioning to higher levels of e-governments maturity requires disciplined planning and implementation – capabilities provided by Government EA. To make these happen, it is important that countries as part of their national strategies provide resources and dedicate efforts to create the necessary ecosystem and the supporting infrastructure. Exhibit 2-6 shows the Net Strategy Framework as proposed by the World Economic Forum in its Global Information Technology Report of 2009, which captures the essence of the discussions above. The influence of ICT adoption and Savvyness can be summarized as following:

A. ICT aids in providing positive thrust to the technology frontier.
B. ICT enables equitable capabilities by diffusion of ideas and financing.
C. ICT enables opportunities for growth and innovation.
D. ICT aids in the reduction of systemic risks.
E. ICT modifies the way spatial-location decisions are made and executed.

Exhibit 2-6: World Economic Forum’s Net Strategy Framework (Source: WEF)

2.4 DIVERGING AGENDAS

As a long term endeavor, government transformation influences several other factors. Despite the fact that the four highly inter-connected virtuous spirals provide positive momentum to W-O-G EA adoption, the fundamental principles of business make it clear that there would be limits to growth. Any system with unchecked growth will ultimately destroy itself if it is not balanced with relevant factors. In this context, the limits to growth refer to factors that typically slow down or obstruct the W-O-G EA adoption. It is important to understand that there are potentially multiple limits and countries have to: (1) identify them; (2) prioritize them; and (3) address them according to their specific requirements. However, the state of affairs in the case of W-O-G EA adoption for connected government is not one of moving at breakneck speed, but of overcoming the inertia to get it to move. Hence the need to slowdown using balancing loops is not immediate. This phenomenon is elaborated in the subsequent sections.

Focus of countries on government transformation leads to pressure on the government to organize and structure its business and services in a manner that is intuitive and has a citizen-centric outside-in perspective. Countries with advanced government EA programs typically capture the outside-in view of the government through their business reference models (BRM). The BRM provides a business-centric view of the government operations and usually organizes government operations through components like business areas, lines-of-business and business functions at the W-O-G level. Such standard approaches tend to discourage and overlooks the need for operational diversity that is needed at the agency level. Resulting from the need to have operational diversity, governments (and their agencies) are under pressure to retain and even enhance operational autonomy. As agencies
start functioning in an autonomous manner, their strategies, goals, objectives, procedures and business focus diverge. This creates competition for resources and usually the larger and more influential agencies are able to garner a greater amount of resources. Aside from certain country specific issues, the general trend described above is widely prevalent globally. Such a scenario creates avoidable duplications and overlaps leading to wastage of precious resources. According to Scott Bernard of Syracuse University, who has been deeply involved with the United States’ Federal Enterprise Architecture program, “agencies are often funded individually and cross-agency initiatives therefore require a designated “lead” that receives much or all of the money for implementation, which is less than optimal. Also, a lack of complete standards for workflow, data, systems, and infrastructure inhibit multi-agency initiatives.” For lower and middle income countries this situation is further exacerbated by the constraints of finance and available capabilities. As a result, the primary focus of government transformation undoubtedly becomes achieving cost efficiencies. “Doing more with less” is the mantra that is all too common in government parlance. The 2008 financial and economic crisis and the unfolding austerity measures by governments around the world makes the goal of cost efficiencies even more pronounced. Efficiencies and performance gained as a result of cost cutting may provide some benefit to individual agencies and organizations; however, aggregated at the national level, it brings deflationary pressures. Without fail this hurts the country and a downward impact on the economy is inevitable. This is a classic example of “racing to the bottom”. The above phenomenon is captured via variables 13, 14, 15, 16 and 17, getting initiated with variable 5 and completing the circle linked to variable 7, and joining the rest of the loop R1. This is shown in Exhibit 2-7 and represents (perhaps) the most important balancing loop (B1: Diverging agendas) in terms of its role and impact on successful adoption of W-O-G EA. From the countries and their government EA programs surveyed in Phase 1 it can be stated without any doubt that the trend of agencies operating with high degree of autonomy leading to diverging agendas is common and instrumental in putting breaks on government-wide transformation activities.

Exhibit 2-7: Limit to Government Transformation with Diverging Agendas
2.5 FEUDAL GOVERNANCE

It would not be an overstatement to say that governance is the most important factor contributing to the success or failure of W-O-G EA adoption. Clearly defined governance and allocation of decision rights increase the probability of successful and effective adoption of W-O-G EA manifolds. A direct and unquestionable impact of operational diversity amongst agencies within the government is the emergence of business silos that operate in their own stovepipes. Amplified by the diverging agendas (discussed in Section 2.4), the business silos are instrumental in creating and abetting the feudal form of operation.

In the context of the agency IT organizations, the CIOs almost operate their “little” empires with negligible serious interactions both with the business-side and IT organizations of other agencies (characterized by low inter-agency and intra-agency communication, cooperation and collaboration). In other words, these artificially created silos lead to technology diversity (each agency invests in technology that is suitable only for itself), which leads to technology stovepipes and bulging technology budgets at the W-O-G level. This, in turn, intensifies the pressure to demonstrate cost efficiencies with regard to any expenditure made on ICT. Hence the single minded focus on measuring and reporting the business value of IT for all CIOs and their IT organizations becomes paramount. This has a direct impact on the credibility of the CIO leadership. Interestingly, this whole series of factors gets boosted by the earlier discussed reinforcing loop R4, thus augmenting the overall impact at the W-O-G level by slowing or even pulling down the government-wide transformation efforts. These variables are collectively captured as a balancing loop (B2: Technology empires). The technology diversity phenomenon elaborated above, in all cases is not a bad characteristic. The problem gets amplified when the diversity leads to investments in isolated, unrelated and irrelevant areas. Managed diversity allows for risks to be distributed across technologies and their supplying vendors, without compromising the autonomy agencies so greatly valued.

The feudal mindset is even more ingrained on the business side of the operations. Government agencies (and their constituent departments) like to and demand to operate in their respective stovepipes in the name of operational autonomy. From a business operations perspective, most agencies rank very low in: (1) the extent to which their business functions depend on business functions of other agencies (by way of sharing, collaboration and commonalities); and (2) the extent to which their business functions are replicated across different constituents. In other words, the primary operating model is overwhelmingly diversified. Some of this can definitely be attributable to history (and legacy). Historically, ministries and departments within governments have been encouraged to operate as relatively independent organizations due to the need to distribute political authority. The concept of whole-of-government as a single coherent enterprise is new, transformational and unsettling. Mostly operating in a monopolistic environment, it necessitates a huge mindset change, hence the cynicism and impatience. The diversified operating model naturally leads to the same functions and activities being replicated across different parts of the agencies and the government organizations, in turn pushing up their operational budgets in support of the wasteful replications and redundancies. Resulting from fragmentation and overlaps are situations wherein there could be multiple departments doing the same thing (oversupply) as well as certain business activities which no department or agency is responsible for (starvation), both having a negative impact on the operational efficiencies and costs, further pushing the pressure to improve cost efficiencies and in turn on the government-wide transformation efforts. These variables are collectively captured as a balancing loop (B3: Business empires). Loops B2 and B3 are depicted in Exhibit 2-8.
2.6 ECOSYSTEM AND THE CRITICAL MASS

Even as the emergence of business silos within the government amplifies the feudal form of governance and the diversified operating model, the reverse influence also comes forth at the same time. There is a definite move to federate the operations of the government so as to derive the benefits of both centralization and decentralization without slowing the government transformation activities. Though it could be argued that at different stages of architecture maturity centralized and decentralized approaches have their utility, nonetheless the most stable and sustainable governance approach in the longer term happens to be federated. This has a long tradition in several forms of government and attempts to balance the accountabilities and allocation of decision rights between multiple governing bodies. This makes the federated approach by far the most difficult to embrace for effective decision making, entailing suitable adaptations by countries taking into consideration respective cultural, political, social, technological and economic factors.

Getting the federated form of governance right brings with it several benefits and positive impacts, one of the primary ones being getting the different constituents of the government to collaborate and share. Collaboration and sharing in this context could potentially include (but are not limited to):

A. Adoption of and conformance to common technology standards and best practices.
B. Establishment of data exchange standards, and adherence to such standards.
C. Rationalization of data to address issues of redundancies, security and integrity.
D. Sharing of common data and other business information.
E. Common and shared applications and application components, leading to use and reuse.
F. Collaboration and sharing between agencies dictated by common overarching business functions.

The extent of collaboration and sharing depends on the maturity and comfort levels of agencies to do so. Each of the above directly influences the adoption of W-O-G EA by addressing key issues pertaining to strategy, business, information, data, application and technology infrastructure, leading to reduction of business duplications and redundancies and standardization of the underlying technology infrastructure. These factors are captured...
through variables 32, 33 and 34 and combined to form the reinforcing loop (R5: **Government as an enterprise**) which is shown in Exhibit 2-9.

An interesting and useful phenomenon that gets triggered as a result of the pressure to federate government operations is the push to expend resources required to develop enablers for W-O-G EA adoption. As discussed previously, the enablers for W-O-G EA adoption is an aggregated factor that typically consists of: (1) reference architectures; (2) frameworks; (3) methodologies; (4) guidance documents; (5) case studies; (6) tool support; (7) awareness and advocacy sessions; (8) legislations and policies and (9) capacity building. Developing and making these components available increases the attractiveness of embracing EA to potential adopters. This is important, because many times, due to the broad and deep nature of work that EA requires, it becomes confusing, in turn leading to trepidation in “taking the plunge”. The enablers listed above help alleviate the fear and encourages governments to take the initial concrete steps. This then creates a pool of initial adopters, “the first movers”. These factors are captured through variables 43, 44 and 45 and combined to form the reinforcing loop (R6: **First movers**).

Exhibit 2-9 shows the two reinforcing loops R5 and R6. Interestingly, these two loops get further reinforced and augmented by loops R2, R3 and R4. This phenomenon is explainable by the fact that parts of the government (or agencies) having higher capabilities in delivering e-services and the ability to embrace new technologies also have an observable preference to adopt government EA. Such organizations and agencies are willing to experiment and take the lead in creating the ecosystem by being the first movers. This, in turn, positively influences the government-wide transformation journey by extracting benefits of the diffusion effect.

![Exhibit 2-9: Government EA Ecosystem and the Lead Adopters](image)

Thus far we have seen six reinforcing loops (R1 through to R6) that collectively play a critical role in the adoption of W-O-G EA centered on the government-wide transformation area. These loops provide the initial momentum, but in order to sustain this momentum and make W-O-G EA a self-sustaining program, it is important to build up the critical mass of adopting agencies so as to cross over the tipping point. Loops R5 and R6 provide a good build up get to the tipping point. Through the lead adopters, governments are able to create a pool of agencies that adopt EA. As adoption grows, the fear of the unknown subsides as more experience is gained. As experience is gained, agencies learn to avoid the traps and work
their way to success, in turn leading to improved business outcomes resulting from EA. In other words, as more agencies initiate their EA programs, the more they traverse the learning curve, moving progressively more quickly. This makes it even more attractive to potential adopters thus increasing the adoption rate even further creating an effective virtuous spiral. This phenomenon is captured through variables 35, 46, 54, 51, 44, 45 and 34 and consolidated as a reinforcing loop (R8: Success breeds success). The only caveat here is that agencies usually take some time to succeed in their efforts. This is a very powerful mechanism that governments can use as a lever to push the adoption of W-O-G EA.

A minor reinforcing loop that gets created as a result of loop R8 is the “bandwagon effect”. These are agencies that, with not necessarily sufficient knowledge just join the lead agencies in adopting EA because they perceive it to be a good thing to do. In itself the bandwagon effect could be a double-edged sword, which means it can provide fodder by contributing to the critical mass, but if not managed well could lead to dissatisfaction and negative word-of-mouth. However, with good enablers (as discussed earlier in loop R5) the bandwagon effect is usually has positive impacts. Reinforcing loops R7 and R8 are shown in Exhibit 2-10.

![Exhibit 2-10: Critical Mass Adopters and the Implementation Learning Curve](image)

2.7 EXPANDING HORIZONS

In most cases EA remains within the discipline of ICT Strategy and Management. This is further strengthened by the fact that currently almost all EA efforts are initiated and managed by the IT organization / CIO office. This constrained way of looking at EA is reinforced by several factors, the key ones being: (1) current literature “conveniently” using Enterprise Architecture and Enterprise IT Architecture interchangeably; (2) emergence of the discipline itself from the IT side of the organization; (3) EA initiatives historically assigned to and managed by the IT organization with limited linkages to other broader areas; and (4) lack of awareness on the business side in appreciating the true scope and potential of EA. Gartner terms this as the “traditional” approach of EA.

In the government context, EA programs are typically managed by the Ministry of ICT (or equivalent), though there are a few cases wherein the organization responsible for government administration or public service development managing the EA programs are emerging. This is important, as it points to partial transformation of the ingrained mindset and also recognition of the role and impact of government EA spanning much more that mere ICT and related issues.
Advanced and effective government EA programs demonstrate a very interesting phenomenon, i.e. they permeate through the organization spanning all key business functions and departments. In other words, these EA programs are not confined to the IT organization (or the CIO office). Largely initiated and generally managed by the IT organization, EA initially faces an uphill task to get active involvement and sponsorship from the rest of the organization. Initial efforts to get the senior leadership involved invites resistance, cynicism and even outright rejection. It naturally takes the organization some successes to begin with and traversal of the steep learning curve, leading to greater chances to succeed and more importantly to demonstrate such successes to the rest of the organization. These have already been discussed in the context of reinforcing loops R7 and R8. An important outcome of loops R7 and R8 is that as EA initiatives succeed, they tend to be more effective in terms of business outcomes, leading to expansion of the program scope and expectations. The expansion of the scope happens by linking government EA to other management practices and disciplines like portfolio management, strategic planning, corporate governance and innovation among others. This kind of integration of EA to other management disciplines contributes to the overall penetration of the EA into the whole of the organization. At this point EA literally turns into the “architecture of the enterprise”. The caveat here is that organizations usually take time and experience to get to this level of architecture maturity. These phenomena are captured through variables 32 and 33 and is collectively depicted as reinforcing loops (R9: Facilitated diffusion) and (R10: Architecting the enterprise) shown in Exhibit 2-11.

Exhibit 2-11: Enterprise Architecture as the Architecture of the Enterprise

2.8 UNDERSTANDING THE BUSINESS VALUE HURDLE

Despite the fact that reinforcing loops R6, R7 and R8 are instrumental in creating the critical mass of adopters and providing the opportunity for much needed experience, there is an interesting downside attached to these. The negative impact of adopters and their success stories starts from the variable 34 (i.e. W-O-G EA adoption), which leads to increase in the
number of agencies and other organization structures in the government that start and derive benefits out of EA. As the adoption of government EA becomes more prevalent and widely diffused, the financial resources required to keep the program afloat keeps escalating. This escalation in the financial burden creates a reduction in the actual program value. This captures an interesting behavior, i.e. the doubters about the W-O-G EA, already cynical about the whole initiative get ignited when made aware about the amount of resources that is ploughed into the program. Constantly looking for cracks, these groups of people start questioning the benefits that are derived from W-O-G EA. In addition, the information about the financial resources expended makes them more vocal and vociferous. This in turn leads to the program owners and other key stakeholders scrambling to demonstrate the program return on investment (ROI), sometimes using dubious ways. This is itself is not a desirable behavior as it shows the core EA group to be insecure and unsure, which could at times lead to slowing or total stoppage of the government transformation journey, thus jeopardizing even the national development agenda. It is interesting to note that such behaviors also impact the organization ability and willingness to adopt new technologies as the risk-averse behavior becomes highly pronounced and visible. This usually is a killer for the innovation culture. This is captured through the variables 34, 35, 36, 37, 38, 39 and 17 combined together into the balancing loop (B4: Program costs) and is depicted in Exhibit 2-12.

Exhibit 2-12: The ROI Conundrum and its Impact on Program Continuity

In an inter-connected loop, as there is more adoption of government EA leading to valuable experience gained by the core group of the implementation team, it elevates the credibility of the Government EA Program Management Office (PMO) and in turn directly influences in raising the expectations from the program itself. This state is now a victim of its own success. The expectations lead to stiffer and stretched targets and gets further amplified by the factors coming in from loop R10. Together, the heightened expectations raise the desired program value, thus negatively impacting the actual benefits derived by the organization and pushing the pressure to demonstrate the program ROI even higher. This is captured through the variables 34, 35, 46, 47, 48, 49 and 38 combined together into the balancing loop (B5: Burden of stretch targets) and depicted in Exhibit 2-13.
2.9 THE POLITICAL DYNAMICS

Perhaps the most important and largely under-addressed factor that systematically resists the adoption of W-O-G EA is the underlying political dynamics in the government. Done to its full potential, government-wide transformation that is driven by EA can bring in major changes to the way government is planned, designed, operated and managed. It can lead to redistribution of authority, rebalancing of finances, changes in organization structures, redefinition in job roles, perceived intrusion into individual autonomy among many other related but very fundamental impacts. For most governments (and civil servants) that (usually) have a limit to their tenure in a given position, bringing in such fundamental changes all at one go is next to impossible. As a result, in most cases, the urge to "cling to power" takes precedence over everything else and government transformation is the first casualty. With such a background, pushing W-O-G EA invites irrelevant scrutiny and questioning. Often such scrutiny is, in reality, a delaying tactic. These kinds of political tactics can often manifest into operational obstacles. For instance, some common reasons provided by parts of the government (ministries and agencies) include: (1) insistence on maintaining own version of all business processes citing operational uniqueness (we’re different); and (2) refusing to share information and collaborate citing confidentiality and state secrecy. If analysed in depth, these operational obstacles are in some form an expression of the feudal form of governance (that was discussed earlier). Many countries are attempting to address the issue of refusal to share government information through open government initiatives. It is early days now, before the actual rules of engagement are codified are implemented widely across in the national governments. Political obstacles impact overall architecture governance effectiveness, which in turn affects the business outcomes. The most difficult part of this whole phenomenon is that it is almost impossible to fully comprehend the actual power-equation, because, like the proverbial iceberg, the part that is visible constitutes less than 10% of the total. As a result the attractiveness for potential adopters to support and embrace government-wide transformation and W-O-G EA wanes, which deepens the silo mindset among the ministries and agencies. This further slows down the overall momentum toward the transformation along with all the linked affects already discussed earlier. The phenomenon of the underlying political dynamics is captured with variables 40, 41, 42 and 51 and collectively put into the balancing loop (B7: Political landmines).
An interesting behavior that is widely observable and can be considered a manifestation of agency autonomy and the feudal form of governance is the “not invented here” syndrome. In operational terms, this means that ministries and agencies while not directly refusing to accept government-wide frameworks, policies, standards, methodologies and other guiding materials, actually attempt to delay the progress by initiating activities and assigning resources to develop the same (or similar) materials specifically for the agency. The reason often cited is that “they’re different” and centrally developed material would not suit their specific requirements. In a general scenario of aggressively pushing to achieve cost efficiencies, such replicated efforts amounts to wasteful use of scarce resources. Such behavior further demonstrates the ingrained divisiveness and the complete lack of “whole of government as a single enterprise” mindset. The phenomenon is captured into the balancing loop (B8: Not invented here) and strengthens the loop B7 discussed earlier.

Exhibit 2-15: Self-Sufficiency as a Perceived Virtue

In some governments, the initial momentum and enthusiasm brings in good disciplined effort to adopt e-government. This is demonstrated via commendable performance and also
manifests itself as a high ranking in the various e-government surveys. As a result the countries reap in economic benefits affected from good governance and also become role models for other countries that aspire to emulate similar successes. Notwithstanding the initial success, sustaining the same level of momentum and senior government leadership involvement to ensure continued success is a different ball game altogether. In most cases, the classic “S” curve of performance, when extended, is likely to be a “rise-stagnancy-fall” curve of performance. The stagnancy and fall part of the performance happens due to two reasons: (1) the country in question actually falls back in performance; and (2) other countries emulate, catch-up and even exceed the role model countries. Both cases, at times are instrumental in deepening the complacency and inertia to keep up the momentum. This is an important phenomenon, because most countries publicly do not state complacency and inertia as a reason for slowing down or even reversing government reforms and transformation. This would amount to sacrilege for the government in power and provide fodder to opposition parties to pull down the government. Hence, this phenomenon of complacency and inertia manifests itself through the several other balancing loops discussed earlier. Exhibit 2-16 shows the balancing loop (B6: Complacency) along with its variables 10, 11, 12 and 17.

**Exhibit 2-16: Complacency and Inertia as System Constraints**

2.10 THE COMPLETE PERSPECTIVE AND LINKING IT ALL

The Phase 1 report includes surveys pertaining to EA and government EA in the past. These have partially identified key challenges that countries face embracing government EA as a decision making and management framework. Nonetheless, the key word is “partially”. Current literature on government EA is incomplete in two regards: (1) the coverage of challenges i.e. all the challenges have not been identified; and (2) the challenges and (hence their) solutions have been looked at and analyzed in a piecemeal approach. Sections 2.1 through to 2.9 presented and discussed 10 reinforcing loops and 8 balancing loops connecting over 50 variables in a single linked and coherent way. The loops and their constituent variables have deliberately been kept generic to ensure wide applicability subject to local adaptations. Exhibit 2-17 depicts the full view. The purpose is to:

A. Understand the dynamics of W-O-G EA adoption aimed at achieving connected government via government-wide transformation.
B. Identify the enablers and inhibitors impacting W-O-G EA driven government transformation.

C. Develop intervention strategies that are likely to provide the highest degree of leverage to encourage and push the W-O-G EA adoption, so as to create a framework for W-O-G EA that takes into consideration the enablers and inhibitors.

Sections 2.1 through to 2.9 address A as above. It is interesting to note that all the “difficult-to-solve” challenges that countries face in W-O-G EA adoption have very little to do with technology, EA frameworks, best practices, methodologies, tools and the like. Yet that is where most countries are spending their efforts and resources. Hence, the divergence between where the resources are being spent and where they need to be spent is growing. There is a mismatch in both understanding and expectations. The chasm between perceived showstoppers and the actual showstoppers is enormous. In other words, governments are spending resources to develop “solutions” without fully understanding and articulating the underlying “problems”. The dimensions of connected government have been delineated in the Phase 1 report of this research. It is very clear that current forms of management, bureaucracy and organization design are insufficient to address issues related to the connected government dimensions, as the challenges to be surmounted in future will not be solvable by solutions of the past. The need would be for management innovation. Gary Hamel defines management innovation “as anything that fundamentally alters the way in which the work of management is carried out, or significantly modifies customary organizational forms, and, by doing so advances organizational goals”. This is the very essence of W-O-G EA for connected government. Current EA efforts focus on lower level innovation, for example, process or operational innovation, product or service innovation and, at best, strategy innovation. The “solutions” seldom look at management innovation that is absolutely essential for government-wide transformation to gain traction and sustain.

Furthermore, this variance gets exacerbated by the fact that most government EA programs are initiated and managed by the Ministry of ICT (or equivalent). This group perceived to be the “IT folks”, who are not even privy to a lot of the other real issues and challenges are expected to make W-O-G EA programs successful by practically operating in the dark. With respect to W-O-G EA, senior government leaders operate in a realm of bewildering uncertainty and staggering complexity and a result find limited success or even fail (and hence discontinue the whole effort).

Interestingly, analyzing all the 10 reinforcing and the 8 balancing loops reveal existence of behaviors captured in all the 10 system archetypes as defined by Peter Senge. This is important as it facilitates design of intervention strategies, discussed later in Section 4.
Exhibit 2-17: Putting it All Together – The Holistic View
3 PERSPECTIVES

The following sub-sections present the viewpoints by government leaders from various national governments and multi-lateral institutions. In each viewpoint the existence of some or most of the reinforcing and balancing loops are evident. Besides acting as a validation mechanism to all the earlier discussions, these viewpoints are also used to determine the most pertinent emergent systemic profiles and the systemic states, which are proposed and described below.

3.1 GOVERNMENT OF NEPAL

Manohar. K. Bhattarai
Vice Chairman
High Level Commission for Information Technology
Government of Nepal

There is a general perception among policy and decision makers that the investment made in eGovernment can only be realized if it ultimately leads to a fully integrated government. From such a perspective, W-O-G EA becomes an aspiration for countries keen on improving their eGovernment initiatives. This is also driven, in part, by the emergence of new governance challenges; be it the realm of terrorism threats or climate change or disaster management that further underscores the need for greater level of coordination / vertical and horizontal integration and [the capability to] respond effectively to the process of “fragmentation” of the public administration sector.

One of the key inhibiting factors [to embrace W-O-G EA] would be the sheer degree of complexities involved, more so perhaps in a deeply entrenched bureaucratic and administrative set-up like that of Nepal. There is a wide range of variation among the government organizations along the dimension of “e-readiness” or for that matter, readiness to take on some business process reengineering related challenges. Some organizations are more receptive and well capacituated to take up technology enabled strategies while others pose formidable change management challenges.

Nepal’s approach unfortunately has not been that of the W-O-G perspective. The integrated and joined-up government and the overall value proposition is that such a scenario generates is the key driver of W-O-G approach. Drawing from a developing country experience, there has not been sufficient debate around the notion of W-O-G perspective as an approach for overarching public sector reforms. This should serve as the entry point before we attempt to build business case for W-O-G EA. Trying to push “technology” alone and trying to decouple W-O-G EA from the overall administrative and public sector reforms agenda will not work. New strategies therefore must be geared towards securing buy-in from key constituencies.

3.2 UNITED NATIONS

Saleem Zoughbi, Ph.D.
Regional Adviser
Information and Communication Technology
Economic and Social Commission for Western Asia
United Nations

In e-government work, and as the focus shifts from providing services to the public to how government agencies work with each other to solve citizens’ problems, it is evident [that] the W-O-G paradigm assumes a more sensitive role that is not only essential but also critical. This
is easily observed in developing countries that are suffering from internal “islands of power” where some government authorities prefer to work independently and in a competition-driven way rather than adopting a complementary approach.

Enterprise Architecture follows an exact and demanding description and specification of an enterprise. Such a methodology would be efficiently applied to loosely coupled “sub-enterprises”. Ministries and government agencies that have the tendency to work independently yet belong to the same government can be easily restructured and re-engineered using EA approaches. Within this empowerment, certainly a W-O-G EA can be a significant opportunity for countries desirous of improving their e-government initiatives. The main objective is not to enable citizens to use technology to benefit from services offered by the government, but rather to enable them to use it to approach [and engage with] governments. In other words, the challenge is to move from a “citizen-centric” to “government-centric” state. Certainly, W-O-G EA is an aspiration for these governments since it provides the capability to assist the public to team up with them for development and betterment of citizen-government cooperation.

The main obstacles to widespread adoption of W-O-G EA can be easily identified. The most important ones are: (1) the weakness of the central authority that cannot assure total participation of different government entities; and (2) heterogeneous public administration policies and strategies which are so rigid that they cannot be adapted to embrace EA practices.

There are several factors that are already facilitating the adoption of W-O-G EA. In particular the following seem to be the most active ones: (1) the potential active involvement of the citizen in how the government does its business. This requires proper EA that can host connected government bodies; and (2) the development of regional relations in such a way that citizen mobility in countries that belong to some defined grouping require the flexibility of connected government practices across these countries. The service of citizens of a country in different regional context is also facilitated strongly by connected government EA.

Two important strategies [that] can encourage the adoption of W-O-G EA include: (1) the democratic reforms and governmental transparency to the citizen; and (2) extending government services to businesses and governments with focus on regional and international linkages (and even enabling serving the citizen in an international and regional perspective) to promote the concept of connected government in a holistic W-O-G approach to embrace EA in these countries.

**Haiyan Qian**

*Director*

*Division for Public Administration and Development Management*

*Department of Economic and Social Affairs*

*United Nations*

W-O-G EA assists in instituting the comprehensive framework that unites ICT strategy, ICT policy, information standards and enterprise architecture across the whole of government. W-O-G EA is definitely an aspiration for countries wishing to improve [their] e-government initiatives for attaining “Connected Government” to promote the integration and mainstreaming of e-government into the broader public sector and administrative reform agenda.

The prime factor that inhibits the adoption of W-O-G EA is the lack of political support from the highest levels of government and the absence of political commitment to back office reforms. The **W-O-G EA is more a reform process of the government sector rather than the**
streamlining of the government ICT structure. The complexity of government functions, which require coordination among multiple agencies, need to have political support from the highest levels of government and must be dealt within a reasonable time scale.

The adoption of W-O-G EA also depends on the maturity of e-government. It is difficult to promote the W-O-G EA [paradigm] in developing countries that are at the early stage of e-government development and lack a well shaped ICT strategy for development. Moreover, some of the institutional barriers include the jurisdictional boundaries between national and sub-national administrations that inhibit cooperation on public sector ICT development. Some of these barriers may be rooted in social values manifesting themselves in a constitutionally-protected separation of powers among different actors [and stakeholders].

Whether it is feasible to implement W-O-G EA or even EA within a single ministry [or agency] depends on a number of factors: (1) political and administrative leadership to develop an appropriate legal and regulatory framework; (2) institutional capacity, ICT infrastructure and skills; (3) resources; and (4) supportive social values (e.g., those that balance the right to privacy concerns with calls for administrative reforms). The absence of these enabling conditions hinders the widespread adoption of W-O-G EA, whereas their presence facilitates it.

The benefit of adopting W-O-G EA has been gradually recognized as a means to facilitate the sharing of information and resources across government agencies with a view to reducing costs and improving citizen services. Some good practices and guides for adopting W-O-G EA have been developed by countries with sophisticated e-government that could be followed by other countries. For example: (1) Australia and New Zealand have explored using the W-O-G approach as a tool for public sector transformation into a citizen-centric joined-up government; (2) the Republic of Korea has expanded the W-O-G context from its successful implementation of e-government and e-participation, to “going green”, which pushes for an across-the-board online [capability] of all civil affairs-related businesses for reform of administration system suitable for global system while contributing to expanding foundation for low carbon and green growth; (3) the Republic of Singapore has proven to be successful in adopting a W-O-G approach, or what is called “Integrated Government” or “i-Gov”; (4) the United Kingdom of Great Britain and Northern Ireland has developed the cross-government enterprise architecture, which is likely to cover sub-national governments as well; and (5) the United States of America implemented the Federal Enterprise Architecture Program in 2007.

As described above, the underlying factors for the flourishing of W-O-G EA can be attributed to the availability of resources, advanced ICT skills in the public sector, and the push for new public management. Many countries in transition and developing countries, such as the Federative Republic of Brazil, the Kingdom of Bahrain, the Republic of Estonia, the Republic of Ghana and the Hashemite Kingdom of Jordan, are also establishing a seamlessly linking e-government agenda [integrated] with broader administrative reforms and the public sector transformation agenda. Moreover, developing countries are well positioned to benefit from adopting new W-O-G EA because they do not have the added expense of maintaining and transitioning from legacy IT systems to newer technologies and can thus leapfrog to advanced EA infrastructure. In addition, W-O-G EA can help ensure the inter-operability of distinct systems.

It should be noted that W-O-G EA does not cover just IT implementation but also all government business processes and, therefore, serves as a tool for the re-engineering of government process and change government. Therefore, it is helpful to have a national e-government strategy, endorsed by legislators, that sets out high-level objectives and
authorizes the necessary actions including, as appropriate, consultations on possible legal and regulatory reforms. [Furthermore], it is recommended to adopt an incremental approach to launching and implementing W-O-G EA and implementation should start from areas where quick and meaningful success can be achieved. A consistent approach over time to institute W-O-G EA should be emphasized due to the complexity involved in effecting change in government processes.
4 INTERVENTION STRATEGIES

4.1 EMERGENT SYSTEMIC PROFILE

Peter Senge in *The Fifth Discipline* argues that to solve difficult problems one needs to understand the “inter-relationships rather than things, for seeing patterns of change rather than static ‘snapshots’”. Taking a holistic synthesized view, the 10 reinforcing and the 8 balancing loops together capture the underlying “genetic” structure of W-O-G EA adoption for connected government. Each causal loop represents a set of inter-relationships among multiple factors / variables. Collectively, they represent the overall systemic structure that connects more than 50 critical factors / variables. The principle of parsimony is thus achieved.

To design effective intervention strategies, it is critical to “diagnose” the issues correctly. In this regard, this research proposes defining and comprehending the emergent systemic profile. Ideally, the aim is to develop a profile for a country intending to adopt W-O-G EA for connected government and then use the profile to design the intervention strategies based on suitability and efficacy. The profiling based approach allows for configurability of the solutions (interventions). Exhibit 4-1 shows the basic approach to construct the emergent systemic profile.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Enablers</strong></td>
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<td></td>
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<tr>
<td>R1: Complexity Triggered Transformation</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>R2: Capability Multiplier</td>
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<tr>
<td>R3: IT Industry in Motion</td>
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<td></td>
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<tr>
<td>R4: Technology Adoption &amp; Usage Maturity</td>
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<td>R5: Government as an Enterprise</td>
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<td>R6: First Movers</td>
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<td>R7: Bandwagon</td>
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<tr>
<td>R8: Success Breeds Success</td>
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<td></td>
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<tr>
<td>R9: Facilitated Diffusion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R10: Architecting the Enterprise</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Inhibitors</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1: Diverging Agendas</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>B2: Technology Empires</td>
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<td></td>
<td></td>
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<tr>
<td>B3: Business Empires</td>
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<td></td>
<td></td>
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<tr>
<td>B4: Program Costs</td>
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<td></td>
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<tr>
<td>B5: Burden of Stretch Targets</td>
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<td></td>
<td></td>
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<tr>
<td>B6: Complacency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B7: Political Landmines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B8: Not Invented Here</td>
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<td></td>
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</tbody>
</table>

Legend: H → High; HM → High-Medium; M → Medium; L → Low

**Exhibit 4-1: Approach to Construct Emergent Systemic Profile**
The causal loops and their inter-connected constituent factors / variables provide senior government leadership with the inputs to initiate the process prognostication in the context of W-O-G EA adoption for connected government. However the prognosis needs to be validated by a detailed examination and analysis to ascertain the underlying systemic issues. This leads to a detailed diagnosis by constructing the emergent systemic profile. The intent is for a country to have a single profile. This facilitates a coherent response. However, it is likely that countries with multiple levels of government may have one national level profile and multiple sub-profiles to address localized issues. In constructing the profile and performing the diagnosis, countries must factor in the targeted evolutionary stage of connected government. The diagnosis performed with the profile information is followed with the relevantly designed intervention strategies. For better effectiveness, the prognosis → diagnosis → intervention cycle is repeated as a continuous learning and improvement process.

The emergent systemic profile points to existence of enablers and inhibitors on two different dimensions (vectors) which are largely orthogonal in nature. In other words, absence of or weak inhibitors do not necessarily mean presence of strong enablers. From an execution viewpoint, there are ramifications that governments need to understand and factor in when designing intervention strategies. The two dimensions (i.e. enablers and inhibitors) are used to identify four unique quadrants called the systemic states, depicted in Exhibit 4-2, that provides a concrete basis (rationale) for designing appropriate interventions.

<table>
<thead>
<tr>
<th>Inhibitors</th>
<th>Enablers</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Low</td>
<td>Initial</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[This is characterized by absence of both the reinforcing and balancing loops, thus in all likelihood pointing to an relatively immature program, requiring further substantial resources and efforts. This also includes re-initiation.]</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Optimal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[The program is characterized by existence of a majority of reinforcing loops which are collectively dominant, and existence of weak balancing loops. Care must taken to maintain status quo.]</td>
</tr>
<tr>
<td>High</td>
<td>Low</td>
<td>Arduous</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[The program existence of a majority of balancing loops which are collectively dominant, and existence of weak reinforcing loops.]</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Profligate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[This is characterized by existence of both strong reinforcing and balancing loops. By itself, this is unsustainable as it is terribly wasteful, and requires sincere efforts to move to the ‘optimal’ state.]</td>
</tr>
</tbody>
</table>

Exhibit 4-2: Systemic States for Intervention Design

The systemic states derived from the emergent systemic profile provide the means to develop strategic navigation pathways for countries. The most plausible pathways that are observed in reality are listed below, depicting the defining milestones in a country’s W-O-G EA journey:

A. Initial ↔ [Discontinued]
B. Initial ↔ Arduous ↔ [Discontinued]
C. Initial ↔ Profligate ↔ [Discontinued]
D. Initial ↔ Arduous ↔ Profligate ↔ [Discontinued]  
E. Initial ↔ Optimal ↔ [Sustained]  
F. Initial ↔ Arduous ↔ Optimal ↔ [Sustained]  
G. Initial ↔ Profligate ↔ Optimal ↔ [Sustained]  
H. Initial ↔ Arduous ↔ Profligate ↔ Optimal ↔ [Sustained]  

Pinpointing the exact systemic state requires profound evaluation; if not, the intervention strategies are likely to be tenuous. Effective intervention strategies are an imperative because these dictate the strategic navigation pathway that is traversed. The links depicted in the pathways are deliberately bi-directional as W-O-G EA programs can traverse in either direction. This is especially more likely in the government context as major changes (like change of political leadership) have the potential to disrupt, revive, weaken or strengthen existing programs.

4.2 DESIGNING INTERVENTION STRATEGIES

The emergent systemic profile and the strategic navigation pathways form the basis for designing interventions strategies. Needless to mention, the specific interventions would depend on the context of country specific nuances. Nonetheless, designing the right interventions are as important as the location these interventions would be applied. In a complex system, there are places where a small shift in one thing can produce large changes in (almost) everything. The places are termed “leverage points – the points of power”. Donella Meadows in her article Leverage Points–Places to Intervene in a System identifies and elaborates generic leverage points where interventions are most likely to be impactful and results bearing. The next few paragraphs elaborate on the leverage points suitably adapted to the context of W-O-G EA for connected government. The leverage points then lead to the plausible interventions which are discussed in the subsequent sections. As a caveat, leverage points and associated interventions is not an exact science, hence discretion is expected and recommended.

A. The mindset out of which the system arises: According to John Zachman, any organization that aspires (and expects) to manage its complexity and change needs architecture. This is absolutely true. Organizations (governments included) view EA as an IT-Management and Strategy discipline. Following from this obviously flawed view, comes paradigms that are deeply ingrained and are the most effective candidates of leverage. Listed below are a few such paradigms as to what they currently are contrasted with what they should be changed to in the context of W-O-G EA for connected government. It is evident from the below that the current paradigms are not only flawed but also severely restrictive. Transitioning to the new paradigms is a gradual process and impacts the very fundamentals of the system but has the power to transform the way W-O-G EA is viewed and along with it influence all the loops discussed earlier. They constitute the most potent of the leverage points.

<table>
<thead>
<tr>
<th>W-O-G EA for Connected Government Paradigms</th>
<th>As they are</th>
<th>As they should be</th>
</tr>
</thead>
<tbody>
<tr>
<td>Governments are primarily hierarchical in structure that are characterized by creative apartheid, over administration, and risk aversion.</td>
<td>Governments embrace a lattice-based architecture that potentially connects every stakeholder in the organization to everyone else, enabled by direct communication channels. There are multiple nodes that are lateral in a dense network of interpersonal connections where information flows unfettered.</td>
<td></td>
</tr>
</tbody>
</table>
### W-O-G EA for Connected Government Paradigms

<table>
<thead>
<tr>
<th>As they are</th>
<th>As they should be</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizations that have not embraced a formal architecture framework or methodology do not have any architecture</td>
<td>All organizations have architecture. The only point of contention is whether the architecture is informal and implicit or formal and explicit.</td>
</tr>
<tr>
<td>W-O-G EA is a project and there is a point when it is done.</td>
<td>W-O-G EA for connected government is a journey that has no end. Following from the earlier point, as long as the organization exists, it needs to be continually architected.</td>
</tr>
<tr>
<td>The techniques, tools and approaches used in the process of architecting are new, and have nothing to do with any existing management practices</td>
<td>Most techniques, tools and approaches used are well accepted. The newness comes from the way they are applied and interconnections between them are so that line-of-sight can be established and maintained.</td>
</tr>
<tr>
<td>Organizational coherency is not important</td>
<td>Management of complexity and change are great reasons to do formal architecture. Nonetheless, as a result of the architecture the organization becomes more coherent.</td>
</tr>
<tr>
<td>The architects do all the architecting.</td>
<td>The architects establish the rules, procedures and shared understanding. The actual activity of architecting is done, to a large extent, by people themselves. The actual role of the architects is to ensure consistency and completeness holistically.</td>
</tr>
<tr>
<td>Enterprise architecture is an IT management and IT strategic planning discipline and remains stuck in the IT trap.</td>
<td>The barriers between business and IT in the context of EA are artificial and constrain its role and derived benefits. Organizations with mature EA view it as a management and strategic planning discipline, which in some literature gets mentioned as second generation EA.</td>
</tr>
</tbody>
</table>

### Exhibit 4-3: Comparing Current and Recommended Paradigms

B. **The goals of the system:** EA is the very essence of good organization design. To move toward connected government and evolve through its various stages (as presented in the Phase 1 report), countries need to design their government(s). In most countries the structure and the behavior of the governments has formed organically. They seldom have been subjected to disciplined and structured processes of planning, design and adoption. There may have been some initiatives and programs in parts of the governments, but in such cases the scope and coverage is piecemeal and the W-O-G continues to remain inefficient in the larger context. Phase 1 of this research identified seven dimensions of connected government: (1) citizen centrity; (2) common infrastructure and interoperability; (3) collaborative services and business operations; (4) public sector governance; (5) networked organizational model; (6) social inclusion; and (7) transparent and open government. These are excellent goals for any government and stand the test of time. In the Phase 1 report, these dimensions are well elaborated and the role of W-O-G EA in impacting these dimensions have also been explained, including how countries need to progress along these dimensions to evolve through the various stages of connected government.

C. **The rules of the system:** This is an area many countries proactively look at seriously as a way to enable W-O-G adoption. These are important as they establish the scope of the system by way of its boundaries and its degrees of freedom. The rules get operationalized through legislations, policies and procedures. The Clinger-Cohen Act of 1997 is an example of a rule operationalized as a legislation that mandates the need to have formal EA for all federal agencies in the United States as part of the Presidential Management EA Agenda. This legislation is very specific to EA in the federal
agencies. However, this is supported by a host of other legislations concerning e-government in the United States. Similar legislative approach to establish the rules of the system exist in Bahrain, South Korea and Singapore. Rules may differ in scope, coverage, specificity and operationalization, but the underlying intent remains consistent, i.e. to define the boundaries and expectations of the system. Rules are strong leverage points. Nonetheless, when setting rules to enable W-O-G EA for connected government, it is critical to identify and understand: (1) expected impact of the rule(s); (2) conflicting and supporting rules, if any; and (3) support system required to enforce the rule(s).

D. **The structure of the system**: Governments are bureaucratic organizations. Their primary purpose is to administer. Transformation and innovation is not business as usual for governments. There have been efforts around the world targeting public sector reforms. Beyond the political rhetoric, in most cases successes have been limited, the primary reason being the structure of the system itself is one of the most deeply ingrained factors. This is because the structure of the system in some sense (both directly and indirectly) reflects authority or the power structure, thereby making it relatively resilient to change. However, if there are ways and means for the system to modify governance structures, add new negative or positive loops, dynamically reallocate resources and make new rules, it gives the ability to the system to self-organize, stay responsive and adapt more effectively. Gary Hamel in his book *The Future of Management* describes the demise of management in the way it is practiced presently due to its inadequacies in addressing current and future organizational issues. Hamel proposes 10 rules for management innovators, all of which are applicable to government organizations. The rigid organization structure that governments relish having in the name of stability more likely than not comes in the way of government-wide transformation efforts, i.e. the structure becomes a drag on the system.

E. **The structure of information flows**: In many situations citizens and businesses believe that information sent to governments tends to go into a “black-hole”; it goes in, and seldom anything useful ever comes out. The virtual non-existence of feedback loops and information sharing makes it necessary to provide the same information more than once. Governments are (usually) the largest collectors and sources of information. However, the appropriate flow of this information is generally impaired and way less than optimal. The feedback loops that enable the information flows bring in accountability in performance. For example, UN E-Government Surveys and the published ranking make many countries start taking e-government seriously. A low rank that is publicly visible makes it embarrassing for national governments.

As part of open government programs countries like India, Australia and New Zealand have or are instituting legislations pertaining to freedom of information. From a W-O-G EA perspective this is both necessary and radical as governments tend to hold back on information citing security and confidentiality concerns. It does not require deep analysis to realize that to successfully traverse the evolutionary stages of connected government, three things pertaining to information are absolutely essential: (1) clarity and understanding in the information collected; (2) clarity in how the collected information is aggregated for decision making; (3) clarity in establishing the channels through which the information flows and who receives the information. The technicalities of frequency, format, protocol and the like are more implementation issues. Thomas Davenport and Jeanne Harris in their book
Competing on Analytics – The New Science of Winning aptly describe the importance of information, information flows and the raw material they provide organizations for building and using analytics as a competitive weapon.

F. The strength and intensity of the balancing (negative loops): Loops B1 to B8 in Exhibit 2-17 are the key negative loops identified and elaborated in the previous sections. Negative loops per se are not bad for the system. These loops, also called balancing loops, correct the system and keep the system in a stable state. Goldratt’s Theory of Constraints (TOC), another systems thinking approach, rightly urges organizations to uncover the constraints and address them before anything else. Even though negative loops correct the system and keep it in a stable state, if dominant they slow down the performance of the system. Almost all governments usually try to ignore the existence and impact of negative loops, hence not acting on them. Instead their focus is on the positive loops and tendency to make them stronger. Fundamentally there is nothing wrong in making the positive loops stronger and dominant via proper interventions. However, strengthening the system by making the positive loops dominant, without weakening the negative loops is akin to accelerating a vehicle without releasing the breaks. It produces friction, leading to intense heat in the engine and ultimately break-down. It is critical that role of negative loops are fully understood in the context of the current system behavior prior to proposing ways and means to use them as leverage points. In a system that is accelerating without control (as a result of highly dominant positive loops), collapse and destruction is very likely. In such scenarios, negative loops are used to full positive effect to slow down the system and bring it down to a more manageable and sustainable level of performance. However, this is not in case of W-O-G EA for connected government.

As has already been explained in the previous sections and also evidenced by Gartner’s Hype Cycle for Enterprise Architecture 2010, W-O-G EA currently faces tremendous headwinds and inertia before it can even start to move, though its adoption is on the upside. The negative loops B1 and B8 directly contribute to the inertia becoming the system’s constraints thus preventing the system to move. The primary source of the inherent inertia that exists in governments and their organizations comes from the short-sighted belief that these entities operate in a monopoly, unless forced to, there is no urgency to bring in change. Hence it is imperative for governments to fully understand the impact of negative loops and design appropriate interventions.

G. The strength and intensity of the reinforcing (positive loops): Loops R1 to R10 in Exhibit 2-17 collectively represents factors that have the ability to push forward and have a multiplier effect on W-O-G EA adoption for connected government. Used correctly, they have the ability to provide the rationale for moving toward connected government using W-O-G EA. In the situation wherein efforts are required for governments to embrace W-O-G EA, the positive loops provide the necessary impetus. From a government perspective these loops need to be strengthened to a level where they can overcome the inertia presented by the negative loops in the system. As discussed earlier, if the strengthening of the positive loops happens in unison with the weakening of the negative loops, the system moves and provides the desired performance. However, it is critical to realize that completely eliminating negative loops altogether is neither possible nor desirable, as they provide the levers to slowdown the system when the system moves at a greater than sustainable pace.
H. **The lengths of delays**: Delays are a critical dynamic characteristic of any system. Exhibit 2-17 identifies some of the key delays that exist in the whole system. Delays are strong leverage points, even though they could be double-edged swords. On the positive side, delays act as buffers in the system that can absorb the shocks and gyrations in the system, whilst on the negative side they seemingly slow down the impact of another change in the system. Delays are common causes of oscillations. In the context to W-O-G EA adoption, the area where delay has a negative impact on the overall system is time needed to reach the critical mass of EA adoptions across the government. As explained earlier, as critical mass is achieved, the system ‘tips-over’ to the new state, thus facilitating system success. However, when the response to specific change is not visible with a reasonable period of time, there is a tendency to believe that the system is not responding, hence the reaction to “push the throttle”, until there is overcorrection followed by oscillations. Despite the fact that delays are strong leverage points, it is important to realize that delays are often not easily changeable. Things take as long as they take.

Applying the above interventions would depend on the emergent systemic profile. Leverage point H through to leverage point A are sequenced in increasing order of effectiveness. Interestingly, the sequence also captures the order of ease of adoption, i.e. as expected, changing the mindset is definitely the most difficult (and not surprisingly) the most effective leverage point for which appropriate interventions can be designed and implemented. Hence an observable trend is that there is a direct correlation between the evolutionary stage of connected government to the leverage points (and intervention strategies) that countries need to employ. In other words, as countries target higher stages of connected government they employ the more difficult (and more effective) intervention strategies at points which give them more effective leverage aptly selected to fulfil the higher requirements and expectations. To attain the **ubiquitous** level of connected government, countries would usually require multiple “cycles” of W-O-G EA programs such that it allows the governments to traverse through and learn from progressively more complete and advanced generations of EA, even as they move through the various systemic states introduced earlier. Exhibit 4-4 maps the interventions strategies and leverage points needed versus the evolutionary stages of connected government as a general guideline for countries to adapt and adopt.

![Exhibit 4-4: Mapping Systemic Interventions to Stages of Connected Government](image-url)
4.3 ILLUSTRATIONS FROM THE REAL WORLD

Government EA efforts around the world have penetrated deep into e-government programs. There is a realization that moving toward higher levels of e-government capability and maturity (especially achieving connected government through government transformation) makes an effective government EA an imperative. Government EA programs surveyed in the Phase 1 of this study clearly evidence that even as governments across the world are attempting to become more collaborative and pervasive, they are also trying to balance these with being less intrusive. Connected government is no longer limited to being what governments are trying to be, but what citizens and businesses are demanding of governments. Yet, in adopting the W-O-G EA paradigm in the context of connected government, countries overly focus on improving the operational enablers at the cost of strategic wisdom and direction. Ignorance, complexity and capability gaps are cited most frequently as the primary reasons.

Operational enablers mean components that countries typically develop as part of their EA programs. These include: (1) frameworks; (2) methodologies; (3) reference architectures and models; (4) tool capabilities; (5) competency building activities; (5) guidelines and standards; (6) best practices and the like. Abundance of operational enablers are clearly evident in the government EA programs reviewed and presented in the Phase 1 report. The skewness in favor of operational enablers is hard to miss. Though operational enablers are important, they, by no means have the ability to supplant the strategic perspective. Their role is primarily in supplementing strategic wisdom and direction. In the absence of strategic perspective, countries unknowingly drift between different systemic states (as shown in Exhibit 4-2), in an arbitrary manner without comprehending the underlying reasons. In such scenarios, which are all too frequent, the program virtually navigates blind leading to cynicism, lack of persistence, erosion of confidence and loss of attention by the government leaders. It almost takes a crisis to make a deep change. And when it is time to address the crisis, the focus is on symptoms, not causes.

For many governments, connected government is a concept and a long term vision. It is the new normal. To make it simpler and intuitive, this concept could be manifested and realized as a Government 2.0 program. Government 2.0 is gaining traction as a means to achieve part of the capability dimensions of connected government. Government 2.0 involves the use of Web 2.0 family of technologies to power government reforms, openness, collaboration, and engagement. In this regard, Australia has shown the way to realize the goals of connected government through its Government 2.0 program. In its report Engage–Getting on Government 2.0, the Government 2.0 Taskforce has made 13 recommendations for the Australian government. These recommendations are excellent examples of intervention strategies and leverage points that have been proposed above, representing the overall strategic wisdom and direction. Exhibit 4-5 maps the 13 recommendations to intervention strategies and leverage points, which demonstrates a reasonable completeness in terms of coverage. Naturally, such strategic wisdom and direction will have to be augmented with elements that facilitates the execution of the vision, in other words the operational enablers.
## Intervention Strategies and Leverage Points for Australia’s Government 2.0 Program

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Exhibit 4-5: Intervention Strategies Proposed for Australia’s Government 2.0 Program

### 4.4 ESCAPING THE SHACKLES — DESIGNING W-O-G EA ADOPTION

This section presents a brief summary of the steps for designing or rethinking W-O-G EA adoption to power the vision of connected government.

A. **Articulate** the goals and objectives of connected government, along with the intended level of connected government maturity. The inability to concisely describe the above is symptomatic of a lack of clarity.

B. **Catalog** the reinforcing and balancing loops that are applicable. Tailor the systems model as required.
C. **Construct** the emergent systemic profile. It is important to fully understand the underlying nuances and inherent characteristics (both implicit and explicit) that give rise to the emergent systemic profile.

D. **Validate** the emergent systemic profile. Iterate and refine as needed factoring in the presence of ambiguity, confounding variables, dynamic complexities and implicit linkages.

E. **Ascertain** the systemic state and determine the strategic navigation pathway. This evaluation needs to be supported by adequate supporting explanation and rationale.

F. **Identify** the leverage points that are pertinent and exploitable. Be sure to take into consideration cultural, economic, political and technological factors that may impact the effectiveness of the leverage points.

G. **Craft** the specific intervention strategies to support the leverage points. In the first pass, articulate the intended impact on the system (i.e. W-O-G EA adoption). Iterate until the desired impact is achieved and implement interventions in full scale.

H. **Scrutinize** the performance of the whole system against the initial set of goals and objectives and make mid-course corrections as new information is gathered and as required. The consequences of the interventions are as important as the interventions themselves.

The above steps ought to be repeated for countries to continuously practise the strategic (systems) thinking and advance W-O-G EA adoption for connected government.
5 CONCLUSIONS AND WAY FORWARD

A few years back Michael Porter asserted “strategic planning in most organizations has not contributed to strategic thinking”. In the case of W-O-G EA adoption for connected government this statement cannot be disputed. Strategic (systems) thinking makes it possible to translate complex information that is inter-connected into simple, yet compelling explanations of not only what is happening, but more importantly “why”. There is no dearth of literature that identifies pitfalls to EA and proposed solutions to avoid such pitfalls. There is also abundant guidance literature available as to how governments (and other organizations) must adopt EA. On the other hand, none of the currently available literatures explain the underlying complexities of EA adoption per se. Gary Hamel’s contention that operational efficiency does not equate to strategic efficiency makes absolute sense in a scenario where governments are gradually transforming from a hierarchy to a lattice (both by neccessity and design).

EA is a very large undertaking for any organization. W-O-G EA is even larger, more complex and more dynamic, making it an imperative to comprehend the underlying complexities in a holistic and coherent manner. Current thinking positions EA as an IT-management discipline. This research intends to dispel this thinking and positions EA literally as the “architecture of the enterprise”. It is well-known that adopting EA at the W-O-G level requires and demands much more than good frameworks, methodologies, tools and technical capabilities. There have been some efforts to identify such influencing factors. However, all these efforts have looked at such influencing factors in a piecemeal manner and hence their proposed solutions are seldom convincing or effective.

The systems thinking approach addresses the “why” of W-O-G EA adoption in the context of connected government and uncovers non-obvious inter-dependencies between the factors such as:

A. Different organization units within the government (e.g. central structure, ministries and agencies).
B. Corresponding actions taken by these organization units.
C. Quantitative tangible variables (such as national economy size) and qualitative ones (such as operational diversity).
D. Short and long-term consequences of government decisions.

W-O-G EA for connected government is a long term endeavor. The technical process of architecting is difficult enough, but understanding the underlying complexities and the interconnected dynamics that contribute to particularly intractable and difficult-to-solve problems makes it intimidating for many countries. Systems thinking, used in this report, looks at these problems and analyzes them with the core intent of: (1) motivating people to change; (2) generating collaboration between groups that blame each other for the current situation; (3) concentrate limited resources to points of greatest leverage; and (4) ensure continuous ongoing learning after key decisions with regard to interventions have been made.

To ensure that the potential of connected government is realized and benefits derived, policy and decision makers play an essential role. W-O-G EA provides the enabling mechanism to understand the holistic viewpoint that is so very crucial. Through the use of tools like the emergent systemic profiles, systemic states and strategic navigation pathways proposed and described in detail in this report, countries have the means to assess, design and advance their W-O-G EA agenda. As Haiyan Qian of UNDESA succinctly puts it “W-O-G EA
is more a reform process of the government sector rather than the streamlining of the government ICT structure.” To make this happen, government EA frameworks must be designed and applied keeping in view the systemic nature of government business and strategic thinking that is required to attain connected government, which countries aspire for. The purpose of this report is not to predict and design the future of W-O-G EA, but to assist countries in inventing it, thus giving every nation the ability to take full advantage of the extraordinary opportunities that lie ahead.
6 REFERENCES


7 ABOUT THE AUTHOR

Dr. Pallab Saha is with the National University of Singapore. His current research, consulting and teaching interests include Enterprise Architecture and Governance. Dr. Saha published his first book *Handbook of Enterprise Systems Architecture in Practice* (2007), his second book *Advances in Government Enterprise Architecture* (2008) and his third book *Coherency Management-Architecting the Enterprise for Alignment, Agility and Assurance* (2009). His books are extensively referred to by practitioners and researchers around the world, making it to the *Top Seller* list in 2008 and 2009. His papers have been translated and published in Korean, Russian and Polish.

Dr. Saha is the primary author of the *Methodology for Agency ENTERprise Architecture (MAGENTA)* (2007/8) and the *Government EA Guidebook* (2010) for the Government of Singapore and has led them to international prominence. They are available in IDS Scheer’s ARIS Toolset. He is a recipient of the Microsoft research grant in the area of Government EA supported by the UN and the World Bank. He consults extensively both in the public and private sectors. He has provided consulting services to the Ministry of Defence, Defence Science and Technology Agency, Infocomm Development Authority of Singapore, Integrated Health Information Systems, IP Office of Singapore, CPF Board, Singapore Healthcare Services, Governments of Oman and Kazakhstan and Great Eastern Life Assurance among others. He has been invited as a keynote / distinguished speaker to the World Bank, UN University, The Open Group, SAP Labs, Denmark IT Society, Korea Institute for IT Architecture, IEEE, Nanyang Business School, Governments of Jordan, UAE, Macau, Korea, Kazakhstan, Colombia, Auditor-General’s Office of Singapore, Singapore Workforce Development Agency and Singapore Government CIO Forum among others. His work has been featured and cited by the UN, WHO, United States Department of Defense, Carlsberg and The Open Group and has contributed to the World Bank’s EA Guidelines for Vietnam. Featured as an *Architect in the Spotlight* by the Journal of EA he has been an external examiner for doctoral research degree to the University of New South Wales and a Visiting Researcher to the UN University. Dr. Saha is a member of Technical Committee on IT Governance to the IT Standards Committee of Singapore.

Earlier, as Head of Projects and Development, he has managed Baxter’s offshore development centre in Bangalore. He has had engagements in several Fortune 100 organizations in various capacities. Dr. Saha holds a Ph.D in Management (Information Systems) from the Indian Institute of Science, Bangalore and has received the best research design and best thesis awards. He is an alumnus of the MIT Sloan Executive Program. He can be contacted at pallab@nus.edu.sg.