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## A CASE FOR ENTERPRISE ARCHITECTURE IN DEPARTMENT OF NATIONAL DEFENCE STRATEGIC MANAGEMENT

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**JCSP 42**

***Exercise Solo Flight***

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## **A CASE FOR ENTERPRISE ARCHITECTURE IN DEPARTMENT OF NATIONAL DEFENCE STRATEGIC MANAGEMENT**

Language regarding Strategic Management in the Government of Canada's public service is aspirational in nature. It speaks to the requirement to be agile, the requirement to be lean, the requirement to be efficient, and the requirement to be effective and be outcomes focused. This language when used is, however, set in a very generic context speaking to high level generalities at the government strategic level. It is the specifics of the plans to implement and to achieve this aspirational vision of what can be interpreted, perhaps disingenuously, as industry buzzwords by departmental leaders, that requires a shift in managerial technique and thought. As a requirement of effective management, it is right and proper that to be effective stewards of the public purse, governmental organizations should be examining the methods, processes and targets associated with program delivery in order to ensure that they are robust, cost effective and have a performance feedback mechanism that is designed to demonstrate system efficacy as well as key results achieved. Concurrent with this requirement is rhetoric that demands government leaders utilize evidence based decision making, be transparent, which includes the provision of open data, and utilizes appropriate risk management techniques. For Department of National Defence (DND) leaders to be effective under this paradigm demands a robust understanding of the organization and how it functions in order to translate strategic goals and objectives into outputs or outcomes, In other words to understand and execute the strategic management function. This paper will make the case that a robust program of Enterprise Architecture will facilitate a better informed, evidence based execution of the strategic management function. Further, this paper will be structured in three sections a discussion of strategic management as currently executed within the department, its performance management and reporting frameworks. It will then define and discuss what is Enterprise Architecture and how it can be used to support the strategic

Management Functions of Defence. The final section will discuss the challenges associated with implementing and utilizing Enterprise Architecture to support decision makers.

## **DEPARTMENT OF DEFENCE STRATEGIC MANAGEMENT**

Strategic management in the context of this paper will be defined as “the art and science of formulating, implementing and evaluating cross-functional decisions that enable an organization to achieve its objectives.”<sup>1</sup> The implication of this definition is that it requires a systematic understanding of not only strategy formulation but the disciplines of programming implementation in a complex horizontally integrated organization and the purpose and methodology of program evaluation. Defence leaders formulate and execute Defence strategy within a broader Government of Canada management context utilizing two key Treasury Board sponsored reporting standards, the Management Accountability Framework (MAF) and the Management Resources and Results Structure (MRRS).

The MAF is designed as set of standardized management practices utilized by the Treasury Board to provide Deputy Ministers (DM) a list of Government of Canada management expectations focused on the reporting of departmental programme results.<sup>2</sup> The MRRS provides the department the Government of Canada standard basis for reporting to Parliament and therefore the public on the alignment of resources, programme activities and programme results. In particular the MRRS structure for each department is required to meet three specifically mandated Treasury Board conditions:

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<sup>1</sup> Daniel Simon, Kai Fischbach, and Detlef Schoder, "Enterprise Architecture Management and its Role in Corporate Strategic Management," *Information Systems and eBusiness Management* 12, no. 1 (02, 2014): 6, <http://search.proquest.com/docview/1491412145?accountid=9867>.

<sup>2</sup> Greg Burt, Colonel and Shawn McKnight, "Defence Strategy Management and the Defence Management System," Chapter 2 in *The Public Management of Defence*, edited by C. Stone, 19-38. Toronto: Breakout Education, 2009, 21.

- a. A clearly defined and measurable set of strategic outcomes that are linked to Government of Canada priorities, intended programme results and horizontal initiatives;
- b. A Programme Activity Architecture that is reflective of the method with which the department allocates and manages resources. The programs and activities within the architecture are to be depicted in order to demonstrate the relationship of the varying programs and activities to each other and the specified strategic outcome(s) to which they contribute; and
- c. A description of the departmental governance structure that articulates the decision-making mechanisms, responsibilities and accountabilities of key decision boards and stakeholders within the department.<sup>3</sup>

To meet Government of Canada reporting expectations DND has instituted the use of a Performance Management Framework (PMF) based on the use of a strategy map and balanced scorecard methodology to operationalize and communicate DND goals and objectives and provide a basis for program evaluation in terms of performance metrics.<sup>4</sup> DND's PMF is focused on answering the following questions:

- a. Did management actually do what it reported?
- b. Was the department's externally reported strategy the same as its internal reported one?
- c. Was the risk management practices the organization described actually applied?

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<sup>3</sup> Greg Burt, Colonel and Shawn McKnight, "Defence Strategy Management and the Defence Management System," Chapter 2 in *The Public Management of Defence*, edited by C. Stone, 19-38. Toronto: Breakout Education, 2009, 22.

<sup>4</sup> Ibid, 35.

- d. Was the externally reported performance metric the same one that management used internally?
- e. When comparative figures were given over time or across Level 1 organizations did they consistently apply the same set of internal standards?<sup>5</sup>

The Government of Canada and DND frameworks noted above allow DND to articulate its strategy and its associated programme results in manner that is understandable to both internal and external stakeholders of the department including most importantly the Parliament of Canada and Canadian citizens. In and of themselves these frameworks are insufficient to the task of managing a large complex organization such as DND. Additional supporting information is required to make effective strategic analysis choices in support of DND outcomes. If it is accepted that a department's Strategy is "the framework of choices that determine the nature and direction of an organization"<sup>6</sup> then that strategy must be converted into meaningful manageable objectives. Those objectives must have been carefully chosen and aligned across the organization to enable its People, Processes and Technologies to pursue those goals as efficiently and effectively as possible while breaking down silos of bureaucracy.<sup>7</sup> Performance metrics must be designed and implemented to provide decision makers information not only about results achieved but to provide insight into the efficiency and effectiveness of the organization.

Implementing reporting and performance management frameworks within the Government of Canada is a shift of managerial approaches, from an input and/or asset oriented approach to an approach focusing on processes or activities and results, or performance metrics,

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<sup>5</sup> Ibid, 22.

<sup>6</sup> Ibid, 25.

<sup>7</sup> Ibid.

has led to a change in the administrative focus of the public service including DND.<sup>8</sup> The shift of focus to performance management was designed to encourage transparency through measurement of key performance indicators; indicators that allow public servants and military personnel to “direct and motivate people thereby allowing them to learn from their mistakes and to be externally accountable to the required agencies.”<sup>9</sup> Additionally, it allows leaders and managers to be internally accountable to the department’s governance system. In most organizations and the Department of Defence is no exception, what is measured will generally be executed, tracked and reported. However, measurement in and of itself is insufficient to guarantee that the intended outcome is what results. An inappropriately formulated measurement, particularly in the public service, may result in undesirable effects. Humans will tend to act strategically with respect to the activities that are measured. If people understand what is considered successful in terms of the reported metric, the activity that generates that successful outcome will become the focus of employee and managerial effort. Performance targets set in advance and achieved easily provide a dis-incentive for employees and managers to continue efforts to improve or achieve better more efficient or effective outcomes. Alternatively, implementation of a metric that doesn’t reflect the required organizational outcome, but is easily measured and achievable while not relatable to the core elements of the system or process being measured may in fact mask performance issues.<sup>10</sup>

Fundamental issues in performance management then deal with the selection of metrics and answering the questions of “how to define the critical few metrics that should be used to

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<sup>8</sup> Joseph Soeters, Bas Riethens and Willem Klumper, “*Measuring Performance in today’s Missions: The effects based approach to operation*,” Chapter 17 In *Managing Military Organizations Theory and Practice*, edited by J. Soeters, P.C. van Fenema and R. Beeres, New York: Routledge, 2010. 219.

<sup>9</sup> Ibid.

<sup>10</sup> Ibid

manage the department and how many should be included to ensure breadth and depth required to steward the organization effectively?”<sup>11</sup> The immediate answer is that the performance measurements selected should be limited to those related to “the strategic organizational goals and objectives and that provide timely relevant and concise information for managers at all levels to assess progress towards achieving these pre-determined departmental goals outcomes and objectives.”<sup>12</sup> Performance metrics selected will differ depending upon their use in the hierarchy of the business. Strategic management metrics should be of a relatively high level while operational level metrics should be more detailed and defined. Metrics should be chosen to ensure that all departmental goals and objectives get appropriate management visibility at all levels. Effective metrics must show trends as well as results (data) for a single point in time and be capable of facilitating the taking of timely decisions to address identified performance issues.<sup>13</sup> The Government of Canada’s shift to a results oriented approach of using metrics to report against the MAF and MRRS by providing an explicit link to Government of Canada outcomes remains the driving force behind the implementation of the Department of National Defence’s performance management framework. Appropriate metrics are therefore fundamental to the department’s managerial cultural. The necessity for the Department of Defence is then to ensure that goals are linked to the right processes, those processes are monitored and evaluated to ensure that they are achieving the intended program result while allowing Senior Leaders decision quality information to support any required decision making.

One option to satisfy the requirement for process performance management and for planners to ensure that goals and objectives are linked efficiently and effectively to resources is

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<sup>11</sup> Dennis F.X. Mathaisal, Joel M. Manary and Clare L. Comm, *Enterprise Sustainability: Embracing the Military’s Ability to Perform Its Mission*, Boca Raton, FL: CRC Press Taylor and Francis Group, 2009, 249.

<sup>12</sup> Ibid.

<sup>13</sup> Ibid, 251.



to use a program structure that translates those goals and directives into outputs which are then listed in a program structure. The program structure would list outputs relative to “major policy, capability desired, geographical area or other meaningful defense or security construct.”<sup>14</sup> In the DND context the program structure should be based on capability areas such as command and control or intelligence surveillance and reconnaissance in order to more tightly link resources to outcomes. The difficulty in using this type of construct is that it works in terms of the ability to resource (fund and staff) the program but has little value in terms of organizational, operational or other purposes.<sup>15</sup> Work with the Department of National Defence’s Program Activity Architecture (PAA) would seem to bear this out. The PAA while useful as a reporting tool for program outcomes and having potential to assist in the allocation of funding and personnel is incapable of describing the organization in such a way as to be able to make effective use of metrics to manage the day to day operations of the department. The ability to utilize resource or control levers to correct actions not in accordance with required outcomes or outputs in support of departmental objectives requires additional modelling or description of the department’s business processes and capabilities to be effective. It is here that the value of Enterprise Architecture can be delivered by expanding the understanding of the organization in a comprehensive fashion.

## **ENTERPRISE ARCHITECTURE**

Enterprise Architecture as concept dates back to 1987 when John A. Zachman identified the need to use “a logical construction blueprint (i.e. architecture) for defining and controlling

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<sup>14</sup> N.J. Webb, A. Richter, and D. Bonsper, “Linking Defense Planning and Resource Decisions: A Return to Systems Thinking,” *Defense & Security Analysis* 26, no. 4 (December 2010): 387-400, 394.

<sup>15</sup> *Ibid*, 395.

the integration of systems and their components”<sup>16</sup> While writing primarily with respect to information systems and integration Zachman included in his framework elements that reflected business goals, strategies, plans, products and partners.<sup>17</sup> Zachman envisioned enterprise architecture fulfilling a broader scope of practice that just in the documentation and alignment of Information Technology or Information Systems. It is unfortunate that overtime the practice of Enterprise Architecture in the wider business community and within government has did not achieve Zachman’s vision and that it use has scaled down in ambition such that its scope of implementation is primarily to support the integration of Information Technology. Enterprise Architecture is now being utilized primarily in support of the documentation of operational business elements for IT alignment and not utilized as a method to document, engineer and model enterprises up to and including the Strategic level.<sup>18</sup> As practitioners of strategic management struggle to articulate organizational goals to lower levels within the organization and to determine the cause and effect relationships between different strategic measures enterprise architectures representing the whole of an organization are enjoying a resurgence of interest.<sup>19</sup> This is true of the Department of National Defence as well.

Enterprise Architecture as a discipline is not a new concept within the Department of National Defence. The 2001 Defence Planning Guidance mandated the use of Enterprise Architecture within the Department and the Canadian Armed Forces. This resulted in establishment of the Director of Enterprise Architecture (DEA) within the Assistant Deputy

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<sup>16</sup> Frank Lin and Harold Dyck, "The Value of Implementing Enterprise Architecture in Organizations," *Journal of International Technology and Information Management* 19, no. 1 (2010): 1-I. 2. <http://search.proquest.com/docview/840244964?accountid=9867>.

<sup>17</sup> Daniel Simon, Kai Fischbach, and Detlef Schoder, "Enterprise Architecture Management and its Role in Corporate Strategic Management," *Information Systems and eBusiness Management* 12, no. 1 (02, 2014): 5-42. 6 . <http://search.proquest.com/docview/1491412145?accountid=9867>.

<sup>18</sup> Ibid.

<sup>19</sup> Ibid. 7

Minister for Information Management for the purpose enabling Enterprise Architecture as a practice within the Department and the establishment of the DND/CAF Enterprise Architecture programme (DND EAP). The DND EAP focuses on three main areas: Enterprise Architecture (EA) development, EA management and EA client support.<sup>20</sup> The EAP is structured as federated model<sup>21</sup> with each L1 and lower organization being responsible to implement the required frameworks and tools as articulated in the DND/CAF Enterprise Architecture Framework(DNDAF) with support and coordination from DEA. The DND EAP to date however has had little impact on the business of defence. It wasn't until 2008 that ADM (IM), through a CANFORGEN, promulgated the DND/CAF Enterprise Architecture Framework(DNDAF) and the associated Defence Architecture Data Model(DADM).<sup>22</sup> The DNDAF definition of Enterprise architecture, designed to be quite expansive and inclusive, as follows:

“A collection of strategic information that defines a business, the information and technologies necessary to operate the business, and the transitional processes necessary for implementing new technologies in response to the changing needs of the business. It is represented through a set of integrated blueprints.”

Source: Defence Terminology Bank (DTB)<sup>23</sup>

The department therefore recognizes that Enterprise Architecture can be used to describe, understand and manage the complex relationships within the defence enterprise. That the

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<sup>20</sup> Canada, Department of National Defence, Chief of Force Development, *Department of National Defence and the Canadian Forces Architecture Framework (DNDAF) Volume 1: Overview and Definitions*, (DEA) v1.8.1, 2013. 7.

<sup>21</sup> A federated model is one in which a family of distinct but interrelated member architectures are created to conform to an overall architectural view while conforming to a centralized standard. The approach recognizes the unique needs of each sub-organization allowing flexibility in the execution of architecture activities yet ensures enterprise wide linkages where necessary.

Randolph C. Hite, Neil Doherty, Nancy Glover, et al, *Business Systems Modernization: Strategy for Evolving DOD's Business Enterprise Architecture Offers a Conceptual Approach, but Execution Details are Needed*. No. GAO-07-451. GOVERNMENT ACCOUNTABILITY OFFICE WASHINGTON DC, 2007.

<sup>22</sup> Canada, Department of National Defence, *Promulgation of The Department of National Defence and Canadian Forces Architecture Framework (DNDAF) and the Defence Architecture Data Model(DADM)*, Assistant Deputy Minister For Information Management CANFORGEN 017/08 ADM IM 042 231944Z Jan 08.

<sup>23</sup> Canada, Department of National Defence, Chief of Force Development, *DNDAF Volume 1,2*.

DNDAF can be used to create a roadmap that will achieve the strategic and corporate business objectives through the provision of a common communication platform to systematically and completely define current (as-is) and desired (to -be) business operating environments.<sup>24</sup>

A properly executed departmental Enterprise Architecture will provide a clear and concise picture of the organization and its internal relationships using a series of integrated views from the DNDAF. These views are interrelated or interdependent products formulated as models, text, diagrams or matrices that provide logical or technical representations of the defence enterprise.<sup>25</sup> The DND EAP is designed to facilitate a holistic understanding of the Defence Enterprise and be used as a tool to enable decision makers to understand the enterprise. This allows decision makers to make an informed choice based on authoritative evidence to support a deliberate plan meeting both departmental goals and objectives for day to day management as well as departmental goals in support of transformation initiatives. Managed carefully an enterprise architecture can “clarify and optimize the interdependencies and relationships among the departments business operations that support operations.”<sup>26</sup>

To support the required clarity and understanding Enterprise Architectures are broken down into 5 broad areas:

- a. Business Architectures which are concerned with describing the organizational parts that provide a service to one or more other parts, their interfaces and the service level agreements between those parts;

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<sup>24</sup> Ibid.

<sup>25</sup> Randolph C. Hite, Neil Doherty, Nancy Glover, et al. *Business Systems Modernization: Strategy for Evolving DOD's Business Enterprise Architecture Offers a Conceptual Approach, but Execution Details are Needed*. No. GAO-07-451. GOVERNMENT ACCOUNTABILITY OFFICE WASHINGTON DC, 2007, 7.

<sup>26</sup> Ibid. 8.

- b. Business Process Architectures which are defined as collection of interrelated tasks to solve a particular business concern or issue or produce a required business output;
- c. Information Architectures which describe the use and structure of information and its alignment to organizational need;
- d. Software or Application Architecture which is concerned with the organization's software applications, their constituent components and objects and the relationship between them and the business need; and
- e. Technical architectures which are concerned with the generic technical requirements supporting other systems.<sup>27</sup>

Specifically, in the case of the DND/CAF, the *DNDAF Volume 2: Views and Sub-views* provide “a standard structure for classifying and organizing the complex DND/CAF information into eight architectural views (Common, Strategic, Capability, Operational, System, Technical, Information and Security) and their associated sub-views”<sup>28</sup> to address those broad architecture areas. The expanded application of Enterprise architectures using the DNDAF views can link departmental processes to strategic goals and outcomes, demonstrate the interdependencies within the DND/CAF organizational construct, define authoritative sources of information for decision support and allow business model alignment across the department by enabling departmental decision makers to clearly understand the impacts of their decisions to an acceptable degree of risk prior to the commitment of resources. Therefore, in general, a properly

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<sup>27</sup> Charl Van Zijl, and Jean-Paul Van Belle, "Organisational Impact of Enterprise Architecture and Business Process Capability in South African Organisations." *International Journal of Trade, Economics and Finance* 5, no. 5 (10, 2014): 405-413. 406. <http://search.proquest.com/docview/1618937059?accountid=9867>.

<sup>28</sup> Canada, Department of National Defence, Chief of Force Development, DNDAF Volume 1,8.

executed DND EAP will improve departmental efficiency and effectiveness by providing DND/CAF with:

- a. Decision support for planning;
- b. Target architectures for transformation and change management;
- c. Common language and current information for performance measurement; and
- d. EA tools, training and resources required to support stakeholders.<sup>29</sup>

### **IMPLEMENTATION CHALLENGES AND EFFECTIVE UTILIZATION OF EA**

Implementation of Enterprise Architecture as a discipline must be approached with caution and it must be adopted in a manner consistent with the proper change management principles. As the Department and the CAF in particular learned to its detriment during the Transformation of 2006 led by General Hillier, running an organization during a major period of change requires careful attention to the details of management. While leadership is the vital ingredient in effecting change in an organization particularly through the establishment and promotion of a strong vision, and the empowerment of others to act on the vision,<sup>30</sup> effective management is required to ensure organizational coherence of effort and purpose throughout the change. The importance of effective planning, coordinating, organizing and controlling cannot be understated in the pursuit of the stated departmental objectives. If an organization does not execute these managerial functions no amount of leadership will solve the issues created.<sup>31</sup> The development of internal plans vital to understanding and executing the required changes was not a CAF strength during the 2006 transformation. The vision was certainly General Hillier's but he

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<sup>29</sup> Ibid.

<sup>30</sup> John Kotter, John P. "Leading Change: Why Transformation Efforts Fail." Chapter 1 in HBR's 10 Must Reads On Change Management. Boston: Harvard Business Review Press, 2011, 1-16. 8-12.

<sup>31</sup> Michael K. Jeffrey, *Inside Canadian Forces Transformation: Institutional Leadership as a Catalyst for Change*. Kingston, On: Canadian Defence Academy Press, 2009. 107-108.

did not espouse a clear strategy for getting there and no such strategic documentation was written. The lack of a formal implementation plan had serious repercussions for the institution. Leadership was expected to act in “mission command sense” but without the clarity of knowing what the outcome they were trying to achieve. The ultimate effect was a lack of guidance for the staff.<sup>32</sup> Transformation was a clear call for an architected approach, an approach which if utilized would have resulted in a disciplined approach to the re-organization of the CAF and resulted in clear meaningful direction. Despite direction in 2001 to utilize architecture it was not in the CAF or Departmental culture to do so.

Organizations planning the adoption and integration of EA into the organization as part of its business processes can be described in three ways: Those who are “accepters”, those who are “improvers” and those who are “transformers.”<sup>33</sup> Accepters are those who are doing it because they are forced into compliance usually through a resource control lever (ex. funding) of some form. Improvers see the value in utilizing EA to improve their planning efforts and executives have considerable interest in its use, it’s use has not however proven to revolutionize day to day activity and EA is limited primarily to technical views, in particular those associated to information systems. Finally, Transformers believe EA is the perfect tool to change the way an organization functions, management understands the benefits and utilizes EA to transform business practices in a systematic way and guide executive decision making.<sup>34</sup> Notwithstanding which type of adopter characterizes an organization for EA implementations to be successful they must follow a predictable process that is introduced then maintained and

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<sup>32</sup> Ibid 108.

<sup>33</sup> Kristian Hjort-Madsen, "Institutional Patterns of Enterprise Architecture Adoption in Government," *Transforming Government: People, Process and Policy* 1, no. 4 (2007): 333-349. 339-340.  
<http://search.proquest.com/docview/229372035?accountid=9867>

<sup>34</sup> Ibid 341-342.

executed on a cyclical basis as a repeatable business process within the organization's management structure.

All EA implementations generally adhere to the following pattern<sup>35</sup>: Step 1 – create the foundation and define the scope of the effort. This will generally be contained in the first strategic view from the DNDAF and be the first architecture product produced. This step includes achieving leadership and executive buy in to the architecture effort, communicating the architecture vision, establishing the architecture governance methodology and allocating resources to the architecture effort. Step 2 – create the architecture defining the current state of the organization, in other words the “as-is” architecture. Select those architectural views (Common, Strategic, Capability, Operational, System, Technical, Information and Security<sup>36</sup>) that reflect organizational goals and objectives, which identify and support those critically important business processes that impact DND's ability to meet its mission<sup>37</sup>. Examples of a critical process in the DND context include the business planning process in support of resource allocation and the force posture and readiness process in support force generation and employment of forces. Step 3 – define future goals and develop the architecture of the future state of the organization, in other words the “to-be” architecture. It is during steps 2 and 3 that process and data gaps or inefficiencies will be identified and dealt with. Key nodes for Performance Management will be recognized and metrics designed to assess the efficiency and

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<sup>35</sup> The procedures described below regarding Architecture implementations are a synthesis of ideas from two articles as follows:

Frank Lin and Harold Dyck, 11-12.

Jahani, Bahman, Seyyed Javadein Seyyed Reza, and Abedi Jafari Hassan. "Measurement of Enterprise Architecture Readiness within Organizations." *Business Strategy Series* 11, no. 3 (2010): 177-191. 178-179 <http://search.proquest.com/docview/194920610?accountid=9867>.

<sup>36</sup> As described in Canada, Department of National Defence, Chief of Force Development, DNDAF Volume 1, 8.

<sup>37</sup> Yaw Marfo Missah, "Business Innovation with Enterprise Architecture," *International Journal of Computer Applications* 120, no. 9 (2015). doi:<http://dx.doi.org/10.5120/21254-4097>. 13.



effectiveness of the system implemented. Process improvement, system enhancement and technological architecture improvement to support organizational outcomes will be products of these steps and documented in the appropriate DNDAF views. Step 4 – conduct and document capability and process gaps and execute risk analysis in support of the prioritization and implementation of change initiatives or projects to achieve the target architecture. Step 5 – supervise the execution and use of the architecture. And finally Step 6 – maintain the architecture, by iterating the cycle described above on a pre-determined cyclic basis. EA implementations align well to a methodical iterative change process and with an appropriate governance framework that will allow for stakeholders to be engaged throughout.

While executing EA, either in its implementation or continued execution, it is important to remember that organizations will grow in their EA maturity as they expand their architecture knowledge and use. Expected benefits with maturity are that predictability, process control and effectiveness will increase through the process and overtime, it is not immediate phenomenon. When an organization reaches its full level of maturity, EA provides rules and definitions necessary for the integration of information and services at the operational level cutting across organizational boundaries to the extent that it prescribes the infrastructure for extended enterprise businesses and sets the conditions and structures for information flow between organizations.<sup>38</sup> It is therefore useful to understand at what level the organization conducting architecture sits in terms of its maturity in order to assess progress towards realizing the expected EA benefits. Models exist to categorize levels of EA organizational maturity. The Institute for Enterprise

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<sup>38</sup> J. Schekkerman, "Extended Enterprise Architecture Maturity Model (E2AMM) Version 2.0." *Institute for Enterprise Architecture Developments, The Netherlands* (2006).

Architecture Developments (IFEAD) provides one such model, the Extended Enterprise Architecture Maturity Model(E2AMM).

The E2AMM characterizes an organization as being in or at one of 6 states or levels as follows:

- a. Level 0 – no program. No documented architectures are in place, there are no architecture frameworks or recognized standards, and the organization is reliant on individuals within the organization for EA knowledge and contribution. Executive management does not regard EA as beneficial, and may not be aware of EA or not wish to be involved;
- b. Level 1 – Initial program. Baseline architecture frameworks and standards have been defined and are approved for use. Architectures are developed in an adhoc or informal manner. The organization is still reliant on individual EA contributors. Executive management is aware of Enterprise Architecture but remains uncommitted;
- c. Level 2 – Program under development. Baseline architecture frameworks and standards have been identified and are being tracked and verified. Architecture program processes are repeatable and usable templates have been developed. The need for compliance to standards has been accepted and metrics are being used to assess process area performance. Executive management demonstrates little awareness and remains skeptical of EA benefits;
- d. Level 3 – Defined program – The EA framework is well defined using standardized and/or customized templates. Processes are documented across the organization. Performance metrics are utilized and monitored in relation to other

- organizational practices and process areas. Executive management is aware of EA benefits and supportive of the program;
- e. Level 4 – Managed – Performance metrics are collected analyzed and acted upon. Metrics predict performance and provide insight and understanding of the organizations processes and capabilities. Executive management supports EA and evaluates the EA program itself and its results; and
  - f. Level 5 – Optimized – EA processes are fully mature and integrated into the organization’s management culture; targets have been set for effectiveness and efficiency goals based on organizational and technical objectives. There are ongoing refinements and improvement to business processes based on a clear understanding of the impacts these changes have on these processes. Executive management is engaged in the optimization processes.<sup>39,40</sup>

After 15 years of effort to institute EA into DND/CAF, I would assess that in terms of maturity the department is transitioning from level 2 to level 3. The DND/CAF EAP is well defined and toolsets, architecture processes and standards exist to support architecture efforts. Executive leadership in DND/CAF however remains largely uncommitted and the vision is not universally supported across the department. Performance metrics are not supported by EA and EA is primarily conducted in silos resident within individual Level 1 organizations within the department. Coordination and EA standards are being supported but not actively advocated by the VCDS through the DEA organization resident within the Chief of Force Development.

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<sup>39</sup> Ibid, 1.

<sup>40</sup> Jahani 181

Organizations intending to implement an EA paradigm in support of the performance management of their operations should be aware of issues related to implementation that have shown to be of concern if not accounted for leading to the failure of the Architecture effort. This list is not meant to be exhaustive but an indicative subset of factors for consideration in the success or failure of an architecture effort. First and foremost the right governance model is critical for success in a complex organization. Autonomous sub-organizations executing disparate lines of operation require governance to achieve commonality and coherence in the execution of the Architecture effort. Pitfalls of not ensuring the right governance model include:

- a. Varying sub-organizations developing disjointed strategies that may result in conflict or redundancy and result in stove-pipe architectures. The EA is designed to be the single authoritative description of the organization, developing architecture in isolation increases risk to organizational objectives.<sup>41</sup>
- b. If the chief architect is out-numbered by sub-organization or process owners' intent on maintaining their autonomy and therefore status quo method of operations, Architecture efforts will fail. Leadership buy in is key even if it is at the level of acceptor.<sup>42</sup>
- c. Organizational change management practices must include the middle managers. Executive Leadership is an insufficient condition in and of itself to drive change. Middle managers have a narrower perspective on the outcomes and objectives of an organization and those managers may view architecture as a "rigid selection of standards and metrics that at best impede their ability to meet organizational

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<sup>41</sup> Jahani, 182

<sup>42</sup> Jahani, 182.

objectives by constraining flexibility and at worst threaten their autonomy.”<sup>43</sup>

This resistance must be addressed and overcome in the initial stages or middle management resistance can derail the architecture effort.

- d. Reviews and metrics programs must be carefully scoped and purposed to support the architecture efforts. Reviews shouldn’t compensate for poor collaboration, while metrics programs must be carefully implemented such that they don’t mask the progress being made in positive light rather than reality. Metrics should be an outcome not a focus.<sup>44</sup>and
- e. Finally EA resources must be adequate to the task. EA success is highly dependent upon having the right competencies and toolsets available from the strategic to operational and tactical levels of the organization. Failure to resource the effort appropriately will lead to failure.<sup>45</sup>

Organizations embarking on enterprise architecture efforts must execute their approaches in a systematic manner, with due care and attention to the outcomes and objectives of the organization, by implementing a deliberate change management process. EA is a process and an ongoing methodology that must be incorporated into the management cycle of the organization and not seen as project with a finite start and end date if success is to be realized.

## CONCLUSION

A correctly defined, implemented and maintained EA will assist decision makers to make solid evidence based decisions based on quality information from trusted data sources. It will ensure alignment and coherence of decisions to be made in support of organizational objectives

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<sup>43</sup> Ibid.

<sup>44</sup> Ambler, Scott. "Governance Gone Bad." *Computing Canada* 29, no. 11 (Jun 06, 2003): 15. <http://search.proquest.com/docview/225004798?accountid=9867>.

<sup>45</sup> Jahani, 182.

instead of in isolated silos and will allow analysis of organizational effectiveness and efficiency to inform future planning by explicitly linking decisions and processes to the targeted objectives and outcomes of the organization. It will allow effective transition of the organization to new organizational constructs capable of better supporting the required organizational outputs and outcomes.<sup>46</sup> As per the DND/AF program Key benefits of EA to the organization will include:

- a. Information Management. Improved quality, availability, and communication of information;
- b. Decision Support. Improved analysis for decision making to reduce risk;
- c. Business Alignment. Alignment of solutions with business strategy and operational requirements;
- d. Managed Complexity. Provision of simplified views that help communicate the complexity of business processes and systems;
- e. Planning, Acquisition and Management Support. Provision of tools to assess cost, benefits, and impacts to support option analysis and risk management;
- f. Change Management and Transformation. Identification of dependencies and management of migration from as-is to target states. Tracking of progress on transformation plans;
- g. Interoperability. Specification of interfaces between systems and organizations (both internal and external) to improve system quality and flexibility;
- h. Economies of Scale. Identification of opportunities for reuse, shared services and information;

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<sup>46</sup> Canada, Department of National Defence, Chief of Force Development, DND/AF Volume 1,2.

- i. Standardized Vocabulary. Enables analysis with a reference architecture that allows “apple to apple” comparisons; and
- j. Compliance. Ensures legal, regulatory and standards compliance.<sup>47</sup>

In the Department of National Defence’s current strategic management process these benefits are not optimally realized. The current strategic management paradigm including the operationalization and communicating of departmental strategy are conducted utilizing the Strategy Map and Balanced Scorecard approach. The strategy map and balanced scorecard enable executive leaders to understand the Department’s strategic objectives and outcomes and use this articulation as the basis of evaluating performance through the use metrics.<sup>48</sup> The Balanced Score Card is one of the most widely used performance management frameworks in the world but it restricts performance measurement to four pre-determined perspectives.<sup>49</sup> These four perspectives exclude key aspects of interest concerning the efficiency and effectiveness of the organization by limiting the focus of departmental leaders. Enterprise architectural views properly constructed and linked to departmental outcomes and objectives will by default create a better more comprehensive approach to the management of departmental performance. But most importantly, in an era of strategic reviews, continual change and resource constraints it will provide the blueprint and management capability to move the department in the direction its leadership wants to go without risk of a failure to understand the plan and its expectation for execution.

This is not to say that architecture will replace leadership. Leadership must still set the vision and the course for the organization and while architectures particularly excel at

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<sup>47</sup> Ibid

<sup>48</sup> Burt, 35.

<sup>49</sup> Mathaisal. 256.

quantitative aspects of change, they are hampered in their ability to deal with qualitative aspects of management which must remain the purview of leaders. A fully mature EA effort within the department will no doubt facilitate better management at all levels and support a much more coherent narrative in its reporting to outside stakeholders.



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