National Defence Défense nationale

Canadian Forces College

Collège des Forces Canadiennes

AN INNOVATION FRAMEWORK FOR STRONG, SECURE, ENGAGED

Maj Andrew Hewitt

JCSP 44

SERVICE PAPER

Disclaimer

Opinions expressed remain those of the author and do not represent Department of National Defence or Canadian Forces policy. This paper may not be used without written permission.

PCEMI 44

ÉTUDE MILITAIRE

Avertissement

Les opinons exprimées n'engagent que leurs auteurs et ne reflètent aucunement des politiques du Ministère de la Défense nationale ou des Forces canadiennes. Ce papier ne peut être reproduit sans autorisation écrite.

Canada

CANADIAN FORCES COLLEGE – COLLÈGE DES FORCES CANADIENNES
JCSP 44 – PCEMI 44
2017 – 2018

SERVICE PAPER - ÉTUDE MILITAIRE

AN INNOVATION FRAMEWORK FOR STRONG, SECURE, ENGAGED

Maj Andrew Hewitt

Word Count: 2292

Compte de mots: 2292

AN INNOVATION FRAMEWORK FOR STRONG, SECURE, ENGAGED

AIM

1. The aim of this service paper is to present to Director General Capability and Structure Integration (DGCSI) a recommendation on how to coordinate innovation within the Canadian Armed Forces (CAF) and satisfy Initiative 105 of Strong, Secure, Engaged (SSE). Leveraging the extant innovation capabilities within Canadian Defence Academy (CDA) and Joint Task Force 2 (JTF 2) will provide innovative solutions to Force Development (FD) challenges within the 20-year horizon of SSE. The requirement for an Innovation for Defence Excellence and Security (IDEaS) program identified in SSE will serve as the central office to coordinate innovation projects across the CAF.

INTRODUCTION

2. Innovation is recognised by the Canadian Government in Strong, Secure, Engaged (SSE) as critical for Canada to address defence needs, mitigate threats, and generate economic benefit for Canada.[1] The CAF is continuously looking for ways to implement emerging technologies, such as artificial intelligence and autonomous systems, yet, there is a dearth of innovative projects which will be realised within the next ten years. In SSE the CAF has announced plans to create the IDEaS program to transform defence innovation in Canada. However, Canada has

[1] Department of National Defence, *Strong, Secure, Engaged: Canada's Defence Policy* (Ottawa: Government of Canada, 2017), 77.

previously committed significant financial investments towards innovation with poor results. The Canadian private and public sectors consistently languish behind other developed nations in developing and implementing innovation projects. How can the CAF reverse this trend and implement SSE Initiative 105 to develop meaningful projects and improve operational effectiveness within the future operating environment (FOE)? This service paper will demonstrate that the CAF needs to adopt best practices from within Canadian Special Operations Forces Command (CANSOFCOM), invest in professional education, and centrally coordinate innovation to support the needs of the future operating environment (FOE).

3. To support this thesis, this paper will articulate the criteria identified by academia to transform a creative idea into realised project. This paper will examine the strengths of two organisations within the CAF which could contribute significantly towards the objectives of Initiative 105: CDA and JTF 2. Lastly, lessons learned from the experiences of the United States (US) military, Israeli Defence Forces (IDF), and the private sector will highlight the importance of investing in professional military education, a holistic operational approach to innovation, and a tolerance for failure with innovative projects.

DISCUSSION

4. Simpson and Murgatroyd define innovation as the process of improving products, services, opportunity, and performance.[2] Canada has long recognised the importance of innovation to sustain a competitive and productive economy and invests $10-20 billion per year through the National Research Council, Research and Development (R&D) tax credits, and other public initiatives. Despite this investment, a United Nations agency ranks Canada last in innovative capacity amongst G7 nations while Canadian labour consistently rates 25% less productive than US labour.[3] The key deduction is that Canadian public spending on innovation has yielded bottom tier results within the advanced economies. Although SSE allocates $1.6 billion for innovation, it is evident that funding alone will not achieve the desired result. Daft and Armstrong identify five processes that complex organisations must have to foster successful innovation:[4]

a. Needs. Identifying the gaps between actual and desired performance. For example: labour productivity, return on capital investment, or capacity to deliver an effect.

b. Ideas. Fostering the nascent creativity within an organisation to solve its problems. Without new ideas, an organisation cannot progress.

---

[2] Murgatroyd, S. and Simpson, D, *EKLI-Knowledge, Learning, and Innovation Study Guide.* (Athabasca: Athabasca University, 2014).

[3] World Intellectual Property Organization, "Global Innovation Index 2017," last modified [or accessed] 31 Jan 2018, http://www.wipo.int/pressroom/en/articles/2017/article_0006.html; Simpson and Murgatroyd, *EKLI*… .

[4] Daft, R. L., and Armstrong, A, (2015). *Organisation Theory & Design 3rd Canadian Edition.* Toronto: Nelson Education Ltd, 2015): 377-378.

c. Adoption. Formally incorporating an idea into the project portfolio with a GO/NO-GO decision. This step is critical to ensure energy and resources are concentrated on projects which support the operational needs of the CAF in lieu of standalone projects.

d. Implementation. The introduction of the project into the organisation by allocating the necessary materials, equipment, training, and personnel. Oversight here is essential to ensure the project achieves its desired effect. Otherwise, all previous steps were carried out for nought.

e. Resources. The labour, capital, and time made available to oversee the entire innovation process. The actual costing of public projects is often a contentious issue given the competitive nature for discretionary public funds within government. It is important to note that SSE makes note of funding but not personnel and infrastructure to establish innovation cells in the CAF.

5. The capacity to carry out each of these five functions already exists within the CAF. For example, the environmental commands have standardised processes for identifying current requirements, such as Director Air Requirements (DAR) for the Royal Canadian Air Force (RCAF). The DGCSI office assesses the FOE to determine future needs for FD. In short, there is a good understanding of what future capabilities and effects may look like. It is finding ways to deliver them within the constraints of defence budgets which is the challenge.

6. CDA is ripe to be a nexus for developing ideas and solutions to the CAF's defence needs. The formation comprises the Royal Military College of Canada, the Royal Military College Saint-Jean, and the Canadian Forces College (CFC) and educates officers of all ranks from the under-graduate to post-graduate level. These institutions allow military professionals the opportunity to collaborate with peers, academics, and prominent members of society to advance the knowledge base of the CAF. Each year, CFC alone produces hundreds of graduate level papers ranging from leadership and command, regional dynamics, advanced joint war fighting, and other defence and war study disciplines. It is unlikely that any other CAF formation would be able to match the diversity, experience, and professional expertise found within CDA. There is no reason why CFC students could not research and answer questions about current and future needs facing Level One (L1) leadership in the CAF as part of their education.

7. With respect to adopting and implementing new projects to support operations, JTF 2 is the most agile and responsive organisation within the CAF. CANSOFCOM is a unique command organisation in that it is independently responsible for Force Generation (FG), Force Employment (FE), and FD under the auspices of one Commander. To fulfill their bespoke operational requirements, JTF 2 has fostered strong relationships with industry and other nations. Of key importance, the freedom afforded to their technicians to develop prototypes and obtain operational authority to trial them in the field provides many unique solutions much faster than the current procurement cycle used by the conventional military. As JTF 2 operates in all domains (air, maritime, land, and cyber) their innovations represent opportunities for the larger CAF to incorporate into their own arsenal. Moreover, it is not just from JTF 2 products where the CAF may benefit. JTF 2 has demonstrated horizontal integration with other Commands to field

innovative ideas. For example, sourcing Air Worthiness from Commander 1 Canadian Air Division for new equipment to facilitate aviation casualty evacuation and fast-rope operations. Another example is with the Royal Canadian Navy for deploying rib boats on the fleet's warships. Murgatroyd and Simpson write that, contrary to popular opinion, innovation can be emulated and taught.[5] The larger CAF can study and codify the interactions that JTF 2 has fostered internally and externally to the CAF. This paper is not suggesting that the conventional CAF interfere or embed itself within CANSOFCOM, but rather incorporate the best practices that JTF 2 uses to bypass intra- and interdepartmental barriers to adopt and implement new equipment relatively quickly.

8. There are additional lessons in innovation which may be learned from other advanced militaries. Adamsky writes that during the Cold War the US military assessed projects as a function of their individual cost effectiveness. The net effect was the provision of piecemeal projects that did not support the larger operational force. In the 1980s, the US military transitioned to a pan-service approach to project innovation that embraced an interdependent relationship between technology, organisational structures, and concepts. This paved the way for the rapid advancement in US military power which culminated in the dominant and net-centric force that fought in the 1991 Gulf War.[6] Conversely, Adamsky notes that since the 1970s the IDF emulated US methodology at the tactical level without developing their own operational and strategic capabilities; most notably absent was professional education for senior officers.

---

[5] Murgatroyd and Simpson, *EKLI*….

[6] Adamsky, D, *The Culture of Military Iinnovation: the Impact of Cultural Factors on the Revolution in Military Affairs in Russia, the US, and Israel*. (Stanford University Press, 2014), 88-91.

Consequently, the IDF fell victim to asking "where are we?" in lieu of "where are we going?" [7] This inability to envision how the IDF fit into their FOE caused doctrinal confusion which Adamsky suggests was evident in the 2006 Lebanon war. The IDF was tactically superb but was without the means to design a campaign for strategic victory.[8] The US and IDF experiences provide two key takeaways for the CAF:

a. Central Oversight of Projects. All projects and change management must be taken within a collective approach to support CAF operations in the FOE. Managing projects in isolation does not ensure a result that contributes to overall operational effectiveness. This speaks to a requirement of a central oversight process or committee to ensure innovation processes are tracking towards common CAF objectives.

b. Professional Education at Operational and Strategic Level. Canada cannot fall victim to the IDF pitfall of merely emulating the US military at a tactical level. Although SSE speaks to an interoperable partnership with the US, Canada must continue to invest in its own professional education to ensure senior officers can define and develop CAF capabilities at the operational and strategic levels.[9] Without this operational context, the CAF will not be able to implement future innovations to provide strategic effects for Canada.

9. Within the CAF, the adoption and implementation of projects vary by service and are well entrenched in regulatory processes. For example, technical and operational airworthiness of

[7] *Ibid.,* 125.
[8] *Ibid.,* 126-129.
[9] Department of National Defence, *Strong, Secure, Engaged*…, 106.

RCAF weapons systems are highly centralised and disciplined processes. The rationale for this stems from over seventy-five years of flight safety and operational lessons learned. Procurement of military capital equipment is another example of a heavily regulated and entrenched process. It spans numerous governmental departments and would require strategic level effort and significant political will to overhaul. Rather than attempt to recreate project adoption and implementation processes, it may be more effective to simply maintain them under the coordination of a centralised office: the IDEaS cell proposed in SSE. Central oversight would ensure that ideas for change could be tracked and monitored as projects progress through the bureaucratic leviathan; ensuring that staff personnel were not erroneously amending the original intent and content of new projects. This would be akin to how the RCAF's Flight Safety program supports operations. It does not interfere with tactical formations carrying out their business but does monitor flying operations and advises the Chain of Command when intervention is prudent.

10. Finally, expectations need to be managed when working in innovation. A study of 9000 new product innovations conducted by MIT demonstrated that over 60% would fail within three years of launch.[10] Consequently, if an organisation wishes to see successful projects to emerge, a tolerance of failure for unsuccessful ones is essential. The independence enjoyed by both CDA and JTF 2 allow for this tolerance and it must be respected by the larger CAF if innovation is to be allowed to flourish.

[10] Siemester, D, "Why Great New Products Fail," *MIT Sloan Management Review*, (Spring 2016): 33-34.

CONCLUSION

11. SSE allocates $1.6 billion of funding and provides a vision of a future IDEaS cell to oversee innovation over a 20-year horizon. This service paper promotes standing up the IDEaS cell as the lead agency of a framework to oversee innovation within the CAF. Innovation depends upon needs, ideas, adoption, implementation, and resources to succeed. These capabilities already exist within the CAF. DG Capability and Infrastructure provides a centralised construct to assess CAF needs in the future operating environment. This paper has argued that the network of CAF personnel, academics, and research stakeholders within CDA represents an excellent opportunity to develop ideas which address these needs. JTF 2 provides a blueprint on how to quickly adopt and implement innovative products and processes.

12. Lessons from the IDF show that the CAF cannot simply adopt American equipment and practices. It is essential that the CAF invest in the development of its officer staff at the operational and strategic levels. This will provide an overarching framework for which all innovative projects should support. The American lesson shows how innovating in isolation yields piecemeal products while innovating from a holistic viewpoint advances operational effectiveness. Lastly, the MIT study shows the need for a tolerance of failure if successful ideas are to flourish. Canada needs a centralised office which can apply these lessons and oversee innovation within the CAF, from identifying FOE needs to implementing solutions. The IDEaS cell can fill this role and ensure the objective of SSE Initiative 105 is met.

RECOMMENDATION

13. This service paper recommends:

a. The Creation of an IDEaS cell as a coordinating office, not a standalone venture, to integrate the innovative ventures within the CAF.

b. Partial funding for Initiative 105 be directed towards CDA to support operational and strategic level education of the officer corps. This education is to include academic analysis of the CAF's defence needs in the FOE and synthesis of solutions.

c. Study and codification of best practices employed by JTF 2 to adopt and implement innovative products for use within the CAF.

BIBLIOGRAPHY

Adamsky, D. (2014). *The culture of military innovation : the impact of cultural factors on the Revolution in Military Affairs in Russia, the US, and Israel*. Stanford University Press.

Daft, R. L. and Armstrong, A. (2015). *Organisation Theory & Design 3rd Canadian Edition.* Toronto: Nelson Education Ltd.

Department of National Defence. (2017). *Strong, Secure, Engaged: Canada's Defence Policy.* Ottawa: Government of Canada.

Murgatroyd, S. and Simpson, D. (2015). *EKLI-Knowledge, Learning, and Innovation Study Guide.* Athabasca: Athabasca University.

Siemester, D. "Why Great New Products Fail." *MIT Sloan Management Review*, (Spring 2016): pp. 33-39.

World Intellectual Property Organization. (2017, June 15). *Global Innovation Index 2017.* Retrieved January 31, 2018, from WIPO Press Releases: http://www.wipo.int/pressroom/en/articles/2017/article_0006.html