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SERVICE SECOND TO SOME: INNOVATION AND BEST PRACTICES IN DEFENCE LOGISTICS

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Exercise Solo Flight

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EXERCISE *SOLO FLIGHT* – EXERCICE *SOLO FLIGHT*

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IN DEFENCE LOGISTICS**

Maj B. Sing

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Disruptive new technologies and business innovations are shaking up many sectors, challenging both traditional businesses and regulators to adapt and keep pace. At the same time, the Government of Canada is working to establish a coordinated strategy on innovation that delivers results for all Canadians

- John Pecman, Commissioner of Competition

Innovation thrives in organizations with a culture that is open, trusting, and conducive to risk-taking and learning from failure rather than avoiding it... Bureaucracy and formal rules may act to constrain innovation by restricting knowledge exchange or productive partnerships.

- RAND Europe

Logistics is a critical mission enabler whose impact in delivering mission effect on the battlefield has not been overlooked, from Sun Tzu to Carl Von Clausewitz to Tom Clancy. So much as the soldier needs an effective weapon, a pilot needs a reliable aircraft, and a sailor needs accurate navigation equipment, so too does the logistician need the tools at their disposal to effect successful integrated logistics, supply chain management and distribution. History has demonstrated that through innovation, the logistician has been able to develop tools to improve upon efficiencies, demonstrated by United Parcel Service (UPS), who learned to use technology as a strategic weapon to serve customers better¹. Each of the former examples from the ‘war fighters’ impact operational effect on the battlefield, and given that, “When men of equal worth fight, the side with the better weapons wins”, each demands improved weapons system performance over successive generations.² While distinctly less about the application of violence, improvements and innovation in logistics systems aim to improve resiliency, robustness, transparency, flexibility and security, each vital in maintaining credibility and

¹ Mike Brewster, *Driving Change: The UPS Approach to Business*. (Chicago: Hyperion, 2007) 14.

² D.L. Kirkpatrick, “Trends in the Costs of Weapon Systems and the Consequences,” *Defence and Peace Economics* 15, no. 3 (June 2004): 259

decision making capacity in the resource constrained defence environment.³

Nevertheless, often advancement and innovation in the tools used by logisticians have failed to be implemented within the Department of National Defence and the Canadian Armed Forces (DND/CAF).

In order to effectively resupply, move, feed, maintain and refuel in operations, support systems must evolve commensurate with the evolution of increasingly complex, large, technically complicated and support dependent weapons systems. Supply and distribution chains in defence must leverage the use of modern technology to maximize efficiency and improve effectiveness during operations, to account for and remain transparent and to empower decision makers through the use of real time accurate information. This evolution necessitates innovation in the field of supply chain management and distribution and DND/CAF should actively seek out civilian best practices and technological innovation from academia, industry and the public sector.

The aim of this paper is to investigate the mechanisms that are available to, and used in defence to ensure that logistics in the CAF are actively staying abreast of and implementing civilian best practices and industry standards in the realm of supply chain management, transportation and distribution. It also looks to identify areas in which the CAF has fallen short in innovation in logistics, and to investigate why. In order to look at innovation in the profession, it is first necessary to evaluate the discipline of logistics itself with an aim to draw parallels between the private and public (defence) sector,

³ B. Timme, "Logistics – old need, but new innovations" *IBM Defence and Intelligence* (Blog) 2 June 2015, <https://www.ibm.com/blogs/insights-on-business/government/logistics-old-need-but-new-innovations/>

demonstrating that although the customer and the bottom line are different, the overall themes of support within business and defence remain consistent. This parallel should be the impetus for cross pollination of ideas and the justification for increased formal interaction with private sector industry.

Secondly, two innovation models will be introduced. The first provides eight key factors of innovation that are discussed in the RAND Corporation Europe Innovation Framework Model proposed in 2014. The model describes innovation systems in general and is applicable to defence in particular. Secondly, the four characteristics of innovation diffusion proposed by Everett Rogers will be used to discuss why new, revolutionary and innovative ideas and technologies have failed to transition to doctrine, policy and practice in defence logistics in DND.

Finally, these innovation models will be applied against some innovation initiatives that are occurring in the Australian Defense Force (ADF), United States Department of Defence (DoD), and the CAF with an aim to determine if they are effectively addressing the key considerations and factors identified in the models.

This paper is being written as a macro level evaluation of innovation within the field of logistics. It does not endeavor to complete an examination of the litany of emerging technologies including sense and respond, autonomic logistics, RFID and the internet of things, 3D printing, and drone delivery, and how they could best serve the CAF. Rather it focuses on the culture of Logistics in defence and seeks to demonstrate both why and how the CAF lags behind civil industry in the innovation and diffusion of advancements as well as those initiatives both within the CAF and from partner countries that seek to rectify these challenges.

LOGISTICS AS A PROFESSION

Elliot Cohen, when evaluating the role of the civil authority in defence discusses the relationship of the profession of arms and the relationship of logistics, in which each is mutually exclusive of the other in a professional sense. In his view, logistics does not directly relate to the ‘management of violence’. However, Cohen notes that, “logistics has considerable civilian analogues and yet is indispensable to military operations. Many of these skills are readily transferable to or from the civilian world.”⁴ Unlike many disciplines in defence, Logistics as a profession has parallels between the public and private sector. The Council of Supply Chain Management Professionals defines logistics as:

“[...] the process of planning, implementing, and controlling procedures for the efficient and effective transportation and storage of goods including services, and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements.”⁵

A similar definition is made by Daras, Kaimakamis, and Zeimpekis in that, “military logistics is the basic supporter responsible for sourcing and providing nearly every consumable item used by military forces worldwide.”⁶ Both definitions infer that logistics is the link that provides coordination and effect between the supplier and the customer. The primary differences in the logistics profession between the private and the public sector is the existence in the former of the ‘profit model’ and in the latter the dire consequences to the soldier and to the mission of failing to provide the efficient and

⁴ E. Cohen, “Appendix: The Theory of Civilian Control,” In *Supreme Command* (New York: Free Press, 2002) 244

⁵ Council of Supply Chain Management Professionals, “Glossary of Terms,” Last Accessed 01 May 2017, http://cscmp.org/CSCMP/Educate/SCM_Definitions_and_Glossary_of_Terms.aspx

⁶ Nicholas J. Daras, George Kaimakamis, and Vasileios Zeimpeki, *Military Logistics : Research Advances and Future Trends*. (Switzerland: Springer, 2015) v

effective logistics.⁷ In other words, the military determines performance effectiveness of defence logistics with the performance metric of availability. This means having what is needed, where it is needed, precisely when it is needed for its end-customer, the soldier. On the other hand the commercial world, manages its logistics with internal performance metrics determined on cost savings, business efficiencies and competitive advantage, not from the perspective of the end-customer.⁸ In their examination of the contrasting models of commercial and military logistics, Rutner, Alves and Cox determine that the underlying expectation of the shareholder for profit demands more innovation than the requirement to provide operational effect to the soldier.⁹ The ‘profit model’ that drives business necessitates innovation in the field of logistics to provide a competitive advantage over the competition. Precision logistics provides this edge by improving analytics, cutting cost and improving overall efficiencies. When it comes to innovation, “In these fast-moving times, failure to act can be riskier than the intellectual and financial investment needed to thrive.”¹⁰

We can look back in history to demonstrate examples of industries that thrived in coming up with creative growth solutions. The UPS case study demonstrates that the power of innovation as it relates to both organizational culture and the requirement to

⁷ C. Zimmer, “For Want of a Nail the Campaign was Lost: DND’s Supply Chain: A State of Performance Paralysis” (Joint Command and Staff Program Course Paper, Canadian Forces College, 2009), 11

⁸ The Wharton School, University of Pennsylvania, “Managing Supply Chains: What the Military Can Teach Business (and Vice Versa)” last accessed April 30, 2017, <http://knowledge.wharton.upenn.edu/article/managing-supply-chains-what-the-military-can-teach-business-and-vice-versa/>

⁹ Rutner, Stephen M., Maria Aviles, and Scott Cox. “Logistics Evolution: A Comparison of Military and Commercial Logistics Thought.” *International Journal of Logistics Management* 23, no 1 (2012) 104

¹⁰ Fortune magazine: “Hidden Risks that can Sink you Business” http://fortune.com/contentfrom/2016/8/8/Hidden-Risks-That-Can-Sink-Your-Business/ntv_a/oEQCA1goIAfxgFA/

take risks to facilitate innovation. Expanding from a successful ground based carrier to it created an airline from scratch, expanded its service from three countries to more than one hundred, and automated its ground delivery methods in the span of less than two decades.¹¹

Wharton College at the University of Pennsylvania identifies that military logistics systems and supply chains are can be broken into three distinct chains to service the varying requirements based on urgency and complexity.¹² Each system has varying levels of congruence with the civilian sector. First, one supply chain involves fast but low volume, moves commodities like food, medicine and clothing. This is the model that is most relevant to the commercial world equivalent and is used by massive logistics efforts of Wal-Mart or Sears. The second chain transports major components like weapons systems that require maintenance and repair over extended periods. This is the system that would be used by organizations such as Boeing and Caterpillar. Finally, the third, which is the most applicable to the military, is the deployment chain in which the military must move large number of troops and material in a short period in trying conditions. This is where the distinction of the bottom line profit model does not translate as well, as often the military will sacrifice efficiency for effectiveness – to ensure that the customer gets what they need.

¹¹ Mike Brewster, *Driving Change: The UPS Approach to Business*. (Chicago: Hyperion, 2007) 216

¹² The Wharton School, University of Pennsylvania, “Managing Supply Chains: What the Military Can Teach Business (and Vice Versa)” last accessed April 30, 2017, <http://knowledge.wharton.upenn.edu/article/managing-supply-chains-what-the-military-can-teach-business-and-vice-versa/>

Some however would argue that military logistics has no parallel in the commercial world — from its size and scope to the deadly seriousness of the term “mission-critical”, the soldier is the customer waiting for products like ammunition, food, water, medicine and fuel for tanks and other combat vehicles, the necessity and impact of the customer in receiving commodities is a life and death situation.¹³ However, the use of the term ‘logistics’ was created out of the military model for moving massive quantities of troops, equipment and the necessary items to sustain them in a coordinated fashion, limited by risk, and pressured by time and space.¹⁴ However, the principals of logistics were later adapted under a business models and were enhanced to levels that surpassed military capability sometime after the Second World War.¹⁵ While industry used to look to the military for lesson’s learned in logistics, it is now equally important that defence industry starts asking questions and taking lessons from commercial best practices.

INNOVATION IN LOGISTICS

Innovation can be understood broadly as the creation and application of new products, services and processes. It encompasses new technology as well as new ways of doing things.¹⁶ Innovation is beyond the scope of just technology. From process

¹³ The Wharton School, University of Pennsylvania, “Managing Supply Chains: What the Military Can Teach Business (and Vice Versa)” last accessed April 30, 2017, <http://knowledge.wharton.upenn.edu/article/managing-supply-chains-what-the-military-can-teach-business-and-vice-versa/>

¹⁴ Stephen M. Rutner, Maria Aviles, and Scott Cox, “Logistics Evolution: A Comparison of Military and Commercial Logistics Thought,” *International Journal of Logistics Management* 23, no 1 (2012) 96

¹⁵ Ibid 97

¹⁶ Jon Freeman, Tess Hellgren, Michele Mastroeni, Giacomo Persi Paoli, Kate Robertson, James Black, “Innovation Models: Enabling new defence solutions and enhanced benefits from science and technology,” (RAND Corporation Europe: Santa Monica, Calif., and Cambridge, UK, 2015)

engineering to organizational restructure and culture alignment innovation serves to advance, sometimes radically, the way in which the function of business is performed.¹⁷

In both the civilian sector and in defence, the discipline of logistics has evolved significantly over the period of the last the twenty years. Like in most other industries, emerging innovation has been pioneered by breakthroughs in information management, wireless, satellite, cellular communication systems, analytics, robotics, and engineering.¹⁸ The changing nature in how both the military and the public at large demand and consume products and thirst for accessibility of media, information, goods and services have driven a paradigm shift in way in which those goods are distributed. The immediacy of the on-demand mentality of the modern age has driven a requirement to be increasingly responsive, savvy and anticipatory in warehousing and distribution management, and ultimately required practitioners of logistics to be able to see and respond to the chain between supplier, warehouse, transit, customer, and end user – from cradle to grave. Just-in-time logistics systems that are Cost-effective and velocity-based have replaced Just-in-case “Iron Mountains” and massive in-theatre warehouses waiting to be called forward using rudimentary overland delivery methods.¹⁹ Goldsby and Zinn of Ohio State note that the renaissance of the 1990’s saw more changes in the process of logistics than in all the decades since the industrial revolution and that advancement in

¹⁷ Mike Brewster, *Driving Change: The UPS Approach to Business*. (Chicago: Hyperion, 2007)p 9

¹⁸ A. Fisher, “Wanted: 1.4 million new supply chain workers by 2018,” *Forbes Magazine*, 2014.
<http://fortune.com/2014/05/01/wanted-1-4-million-new-supply-chain-workers-by-2018/>

¹⁹ L. Myers, “Eliminating the Iron Mountain” *Army Logistician* (July Aug 2004).
http://www.alu.army.mil/alog/issues/JulAug04/C_iron.html

the domain of supply chain management and transportation, spurred by innovation in the internet and communications domains, continues to evolve unabated.²⁰

It is no surprise the realization of the importance of continued innovation in the disciplines has become the cornerstone of success for many companies. Champions of industry have discovered the value and necessity of innovation in supply chain management and logistics. Examples include Walmart, who manufactures nothing yet leads the way with a world class and revolutionary supply chain management and just in time logistics.²¹ More recent examples extend to Uber and Amazon who have reinvented transportation and outbound logistics, marketing themselves on tools and technologies that were not available at the turn of the millennium. Each has fostered innovation to change the paradigm and ensure their enterprise continuously stays ahead of its competition.

While private industry is primarily driven by profit and seeks to leverage the advantages of innovation in logistics to satisfy customer demand and to gain a competitive advantage, the justification for innovation to improve efficiencies, cost savings and transparency in defence logistics in Canada are equally compelling. DND is answerable to government for material accountability and transparency, and business efficiency in the management of materiel. These principals of logistics also have an operational effect as they aid the decision maker or the Commander. Seeking to improve

²⁰ T. Goldsby And Walter Zinn, "Technology Innovation and New Business Models: Can Logistics and Supply Chain Research Accelerate the Evolution?" *Journal of Business Logistics* 37, no. 2, (2016) 81.

²¹ C. Zimmer, "For Want of a Nail the Campaign was Lost: DND's Supply Chain: A State of Performance Paralysis" (Joint Command and Staff Program Course Paper, Canadian Forces College, 2009), 21

upon supply metrics concerning commodity availability, maintenance requirements and resupply risk ultimately translate into decision making power and battlefield effectiveness and the view that “logistics is a weapon in military strategy.”²²

Although driven by a different bottom line, scope and scale and customer, the similarities between private and defence sector logistics necessitate that they be complementary in the area of innovation. Yet although the accessibility of lessons learned and best practices available from the private sector, the Department of National Defence (DND) and the Canadian Armed Forces (CAF) has fallen behind modern industry standards in our ability to successfully integrate aspects of total asset and in-transit visibility across the supply chain. DND and CAF has failed to harness innovations in the field of logistics and failures to learn and implement industry best practices have limited the efficiency, effectiveness, responsiveness and accountability of this vital defence enabler. As noted in the Procurement Guide, “New ideas Submitted from the support community almost always reflect a deficiency rising from either technological or economic obsolescence.”²³

This obsolescence has come from the fact that in a profit-based sector, logistics has become more prominent and is recognized as a critical factor in competitive advantage.²⁴ However, in defence logistics there is no competition for the service provider and given that defence gauges performance in a non-competitive market by

²² Cozmin Marinescu, "Military Logistics Management: Similarities and Differences with Corporate Logistics Management," (International Scientific Conference “Strategies XXI”, 2012) 203 <https://search.proquest.com/docview/1327711729?accountid=9867>.

²³ Canada. Department of National Defence. *Project Approval Directive (PAD) 2015*. Chap1

²⁴ Sut Sakchutchawan, "Contemporary Logistics Innovation for Competitive Advantage: Concept and Operations," *Global Journal of International Business Research* 4, no. 4 (2011): 15

effectiveness and not efficiency, there is little impetus for to challenge the status quo. Realizing the value of innovation in defence is compounded by the consideration of cost, security, each of which pose a risk to both effectiveness and efficiency. Advanced technological systems that rely on wave communication are more vulnerable to cyber-attack and cyber espionage. While the system becomes more dependent on both the flow of materiel and information and less focused and more reliant on the expedient systems, “as a system of ‘adding value’ through the reduction of stock holdings or volume - counterpoised against an increasing demand for velocity – armies are becoming increasingly vulnerable to anything that interferes with or interdicts this flow.”²⁵

The key to breaking down the challenges of innovation is to focus on first setting the necessary conditions for success. By taking a systems approach looking at culture and communication, the propensity that new ideas and creative ways of approaching challenges will be diffuse through the organization is greater. The Eight Factors of Innovation and the four elements of diffusion proposed by RAND and Rogers respectively provide a systems model for effective innovation.

Eight factors of Innovation:

Cognizant of the value of innovation in the field of logistics and the existence of the external sources within the private/corporate setting, the UK Ministry of Defence (MOD) commissioned RAND Europe to conduct a study of innovation models and make recommendations on changes within the MOD that would facilitate a better harnessing

²⁵ Australian Army, “Beyond the ‘Iron Mountain’: The Paradox of Efficient Logistics,” last accessed 12 April 2017, <https://www.army.gov.au/our-future/blog/logistics/beyond-the-iron-mountain-the-paradox-of-efficient-logistics>

and absorption of innovation from academia, industry and the public sector.²⁶ The RAND study identified eight key factors in innovation, including drivers, knowledge assets, talent, capital, infrastructure, networks and connections, structure and culture and categorized each as an input resource or an enabling resource. The following section aims to explain the principles behind each factor so that they may be applied to innovation initiatives occurring in defence.

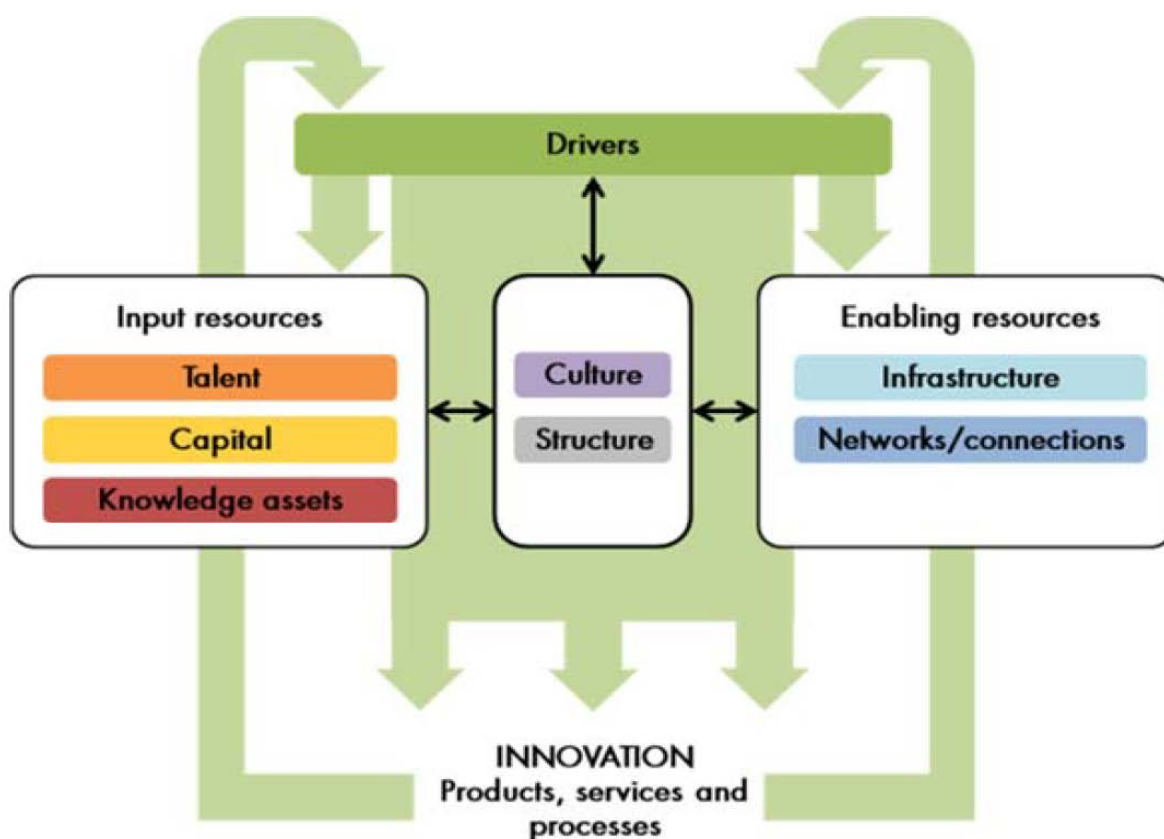


Figure 1.1 – Analytical Framework for understanding the innovation process

Source: RAND Europe, Innovation Models: Enabling New Defence Solutions and Enhanced Benefits from Science and Technology

²⁶ Jon Freeman, Tess Hellgren, Michele Mastroeni, Giacomo Persi Paoli, Kate Robertson, James Black, “Innovation Models: Enabling new defence solutions and enhanced benefits from science and technology,” (RAND Corporation Europe: Santa Monica, Calif., and Cambridge, UK, 2015)

Drivers are the motivations which spur innovation to occur. As previously discussed, defence logistics is not motivated by effecting processes with that are profit driven. Rather drivers in logistics point to requirements for efficiency, readiness and transparency. As indicated by a Defence Research and Development Study conducted by Boukhtouta and Berger aimed at identifying the need for improved in-transit and in-theatre asset visibility, “There is a growing need within Canadian Armed Forces/Department of National Defence (CAF/DND) to generate timely and accurate asset information to decision makers and operators.”²⁷ Formal policy can also act as a driver in innovation. The 2009 Defence White Paper in Australia identified an urgent need to create greater efficiencies and drive productivity benefits in the provision of logistic support, stating that the lack of industry standard technology and automation was not providing effective outcomes when benchmarked with comparable commercial practices and comparable industry standards.²⁸ This initiative was formalized in the Defence Logistics Transformation Program (DLTP), which will be discussed later.

Knowledge is required to discover the new ideas that spur innovation as well as to refine, apply, share and market these ideas in a usable form.²⁹ Knowledge of both innovations in the field of logistics as well as how to optimize and communicate the benefits of implementation, is something that is not taught in the training system. The

²⁷ A. Boukhtouta and J. Berger, "Improving in-transit and in-theatre asset visibility of the Canadian Armed Forces supply chain network," *2014 International Conference on Advanced Logistics and Transport (ICALT)* (Hammamet, 2014) 149. <http://ieeexplore.ieee.org/document/6864109/author>

²⁸ Australia. Australian Defence Force. *Defence Logistics Transformation Program: Statement of Evidence to the Parliamentary Standing Committee on Public Works* (Canberra, Australian Capital Territory: Australian Government, June 2012)
<http://www.defence.gov.au/estatemangement/governance/Committees/pwc/docs/SOExample.pdf>

²⁹ Jon Freeman, Tess Hellgren, Michele Mastroeni, Giacomo Persi Paoli, Kate Robertson, James Black, “Innovation Models: Enabling new defence solutions and enhanced benefits from science and technology” RAND Corporation, Santa Monica, Calif., and Cambridge, UK, 2015
https://www.rand.org/content/dam/rand/pubs/research_reports/RR800/RR840/RAND_RR840.pdf

Log Branch while recognizing professional designations such as professional supply chain certification and professional logistics designations on merit boards, does not look to leverage this education and knowledge into key positions within SJS, the Log Branch Integrator, or Capability Development. Leveraging knowledge obtained through civilian designations and formal education would serve to better impress the knowledge base of innovation in the Log Branch.

Talent refers to both the technical and managerial expertise necessary to support successful innovation processes. The Australian Defence Force states in their logistics magazine that in order to complement the changing nature of operational and platform support delivery, “business management practices must be redesigned and matched with enhanced corporate skill sets to ensure sustainment and supply chain resilience for totally effective logistics support.”³⁰ In order to achieve this redesign ADF initiated DLTP, a 752 million dollar program in collaboration with industry. Recognizing that skill sets pertaining to expertise in automated and efficient management system of warehousing and distribution(W&D) and Land Material Maintenance (LMM), tenders to industry for contracts sought to evaluate proposed bids that brought with them innovative solutions.³¹

Capital is required not only to fund the creation of ideas but also to effectively package and deliver this knowledge as an innovation. While the challenges associated with procurement mechanisms within government outlined in the Procurement Approval Directive are not part of this evaluation, it is recognized that the bureaucratic nature of defence limits the ability for defence to independently create a culture of innovation

³⁰ M. Staib, “Logistics Professionalism” *Australian Defence Force Logistics Magazine*, 1 April 2011, 1. http://www.defence.gov.au/jlc/documents/defence_logistics_magazine_the_link_issue_8.pdf

³¹ Australia. Australian Defence Force. *Defence Logistics Transformation Program: Statement of Evidence to the Parliamentary Standing Committee on Public Works* (Canberra, Australian Capital Territory: Australian Government, June 2012)

without peripheral government policy buy in and resource allocation in the way of funding and mandate.³²

Infrastructure includes facilities and research hubs that provide a physical space for innovation, such as universities, science parks and test facilities. In the DLTP model, the reforms aimed towards innovation support a significant Infrastructure Project which is delivering new and refurbished purpose-built facilities to modernize the Defence logistics network. Construction commenced in December 2012, with works scheduled to be completed progressively from late 2014 through to late 2016.³³

The Deputy Commandant for Installations and Logistics for The United States Marines has taken this a step further, and has solicited for innovative ideas within the corps itself. Logistics Innovation Challenges pose two problem sets to the general marine population, soliciting ideas regarding wearable technology as well to address logistics processes and with modern innovations like 3D printing. More than just policy implementation, winners of this contest will work with public and private laboratories to further develop and refine the products as well attending an innovation boot camp.³⁴ Such initiatives link innovation infrastructure with defence.

Networks and connections encourage the exchange of knowledge, the mingling of talented individuals and the connection of suppliers to end users and are closely linked with Culture and Structures. Innovation thrives in organisations with a culture that is open, trusting, and conducive to risk-taking and learning from failure rather than avoiding

³² Canada. Department of National Defence. *Project Approval Directive (PAD) 2015*

³³ Australia. Australian Defence Force. *Defence Logistics Transformation Program: Statement of Evidence to the Parliamentary Standing Committee on Public Works*. Canberra, Australian Capital Territory: Australian Government, June 2012.

<http://www.defence.gov.au/estatementmanagement/governance/Committees/pwc/docs/SOExample.pdf>

³⁴ United States Marine Corps, "Logistics Innovation Challenges" Last Modified 14 June 2016, <http://www.marines.mil/News/Messages/Messages-Display/Article/898010/>

it.³⁵ A supportive culture of innovation is often linked to leadership which is future orientated and willing to support creative solutions. Closely linked with culture is structure, which includes organizational, management and bureaucratic structures. One of the major challenges that confronts defence is that, “Bureaucracy and formal rules may act to constrain innovation by restricting knowledge exchange or productive partnerships.”³⁶ The United States Army and the Marine Corps have found creative ways to address this bureaucracy.

Founded in November 2013 and born from the Logistics integration and the Logistics Transformation agencies, The United States Army has implemented a logistics innovation agency tasked with a mission to assess and integrate innovative logistics solutions, policies, processes and programs in support of the Chief of Staff of the Army and Deputy Chief of Staff, G-4 priorities.³⁷ Their efforts have resulted in both cost savings and efficiency in areas such as total asset visibility – mobile asset tracking system, green energy, synchronization of maintenance and supply chain.³⁸

Following Secretary of the Navy Ray Mabus’ kickoff of Task Force Innovation in January 2015, Rear Adm. Jonathan Yuen established the Logistics Innovation Cell (LogIC). This small and agile team within the NAVSUP Headquarters is charged to collect innovative logistics concepts, remove roadblocks, and identify and deliver

³⁵ Jon Freeman, Tess Hellgren, Michele Mastroeni, Giacomo Persi Paoli, Kate Robertson, James Black, “Innovation Models: Enabling new defence solutions and enhanced benefits from science and technology” RAND Corporation, Santa Monica, Calif., and Cambridge, UK, 2015
https://www.rand.org/content/dam/rand/pubs/research_reports/RR800/RR840/RAND_RR840.pdf

³⁶ Jon Freeman, Tess Hellgren, Michele Mastroeni, Giacomo Persi Paoli, Kate Robertson, James Black, “Innovation Models: Enabling new defence solutions and enhanced benefits from science and technology” RAND Corporation, Santa Monica, Calif., and Cambridge, UK, 2015
https://www.rand.org/content/dam/rand/pubs/research_reports/RR800/RR840/RAND_RR840.pdf

³⁷ United States Army, Logistics Innovation Agency, “Science Technology Advocacy and Innovation” last accessed 20 April 2017, <https://lia.army.mil/>

³⁸ *Ibid*

effective relevant initiatives swiftly to the Fleet.³⁹ Each is an example of leadership involvement and an effort to impact culture through the creation of innovation cells that are not hampered by the bureaucratic nature of defence. While it is acknowledged that due to the size of DND, similar models would be difficult to implement, the initiatives address culture and structure and have delivered tangible benefits and cost savings.

Rogers Diffusion of Innovation Model

Rogers, in his influential 1962 book, discusses not only the importance of realizing innovation but also the diffusion of innovation. He describes “*Diffusion* is the process by which an innovation is communicated through certain channels over time among the members of a social system.”⁴⁰ Rogers’ evaluation of innovation goes beyond just seeking out and implementing innovative ideas and technologies, it investigates means and ways in which innovation moves from new ideas to acceptable norms and standards. Applied against how innovation in the field of logistics within DND we can establish an understanding of the stress points that have thus far prevented any major steps in the adaptation of innovative practices. Inherent in his definition of diffusion, the four main elements can be categories as innovation, communication channels, time and the social system.

Innovation – The discipline of logistics serves to support the operation as an enabler and thus, by nature takes a back seat to the needs of the operator. In a resource constrained system we find that prioritization of funding for system enablers rather than for weapons systems does not garner the same priority. Therefore we can say that the

³⁹ United States Navy Supply Corps Newsletter, “The Hatch: Challenge the Force...Change the Game” Last Modified 3 June 2016, <http://scnewsltr.dodlive.mil/2016/06/03/navsup-logistics-innovation/>

⁴⁰ Everett M. Rogers, *Diffusion of Innovation* (New York: Free Press, 1983), 5.

Logistics community writ large has failed to adequately communicate the importance and the value of innovation in the field and how improvements to enabling systems translate into improved operational effect. The divide between operational and support communities must be bridged by addressing requirement for visibility and accountability within government and will provide the impetus needed for advances in tools within the support system.

Communication Channels are the means by which messages get from one individual to another. Secondly communication channels within logistics are complicated in that the Logistics community does not serve a single element, and while the need to innovate and the benefits associated with cultural change and the adaptation of new technology serve to improve the effectiveness of each of the branches, messaging and resourcing of improvement of logistics systems are under prioritized. This lack of traction at the strategic level was the impetus for the creation of the Strategic Log (J4) within the Strategic Joint Staff. Given that the Logistic Branch is one of the only branches not functionally managed by a Service or championed by an L1, the move aimed to provide the branch with a strategic level champion and to communicate the needs to a wider audience.⁴¹

Time - Within government, the bureaucracy of decision making is inherently risk adverse. Because of this aversion, the time that it takes from knowledge through decision impacts the time in which an innovation can be adopted. We take the classic model of RFID as a case in point. Technology in this field has existed in civilian industry since the mid 1990's, yet defence has failed to implement the technology as a system within

⁴¹ Canada. Chief of the Defence Staff. *Transfer of Logistics Branch integrator to Director General Support / Strategic J4*. Ottawa: National Defence, 27 Aug 2014.

Logistics due to training considerations, operational posture and tempo, infrastructure limitations, and personnel turnover.⁴² Additionally from the standpoint of innovation, many projects take longer to implement than the military lifecycle of personnel with the subject matter expertise to implement.⁴³

Military and governmental social systems are hierarchical and bureaucratic in nature, thus percolation and the diffusion of innovation from the ideas of the masses to the leadership who necessarily has to support innovative ideas is difficult. We can see in the examples of the USMC who look to reduce separation of ideas from the population and the leadership who are able to effect change. Crowd sourced idea platforms are designed to harness the innovative thoughts from across the services but are still subject to the same funding and implementation limitations as other procurement and project initiatives.

CANADA

While this paper has aimed to demonstrate that logistics innovation has failed to deliver modern tools that satisfy the requirements of the modern battlespace, several positive initiatives have been born of the realization that there is room for improvement. Although the Log Branch campaign plan vision is for a Logistics Branch that delivers world class sustainment to achieve operational and institutional excellence, and includes a line of operation for professionalism and a decisive point of comparison to industry and

⁴² B. Violino, "The History of RFID Technology." *RFID Journal* (16 Jan 2005): 1
<http://www.rfidjournal.com/articles/view?1338/2>

⁴³ C. Zimmer, "For Want of a Nail the Campaign was Lost: DND's Supply Chain: A State of Performance Paralysis" (Joint Command and Staff Program Course Paper, Canadian Forces College, 2009)

corporations, little focus was applied in the past to improving sustainment means or for institutional excellence as it pertains to the wider development of support capabilities.⁴⁴

However, as part of the creation of the Strategic Joint Logistics (Strat J4) Directorate under the Strategic Joint Staff (SJS) there has been some significant headway in the application of innovation research and tracking from both the civilian and military sectors as it applies to improvements in operational support. Looking less at the functions such as governance and training that fell in the mandate of the Logistics Branch Integrator, Strat J4 focuses on the delivery of Joint Support Capability Development and has a line of Operation (LOO) that is dedicated exclusively to innovation as it pertains to operational support.⁴⁵ Although it could be argued that there is still limited synchronized or holistic perspective to innovation regarding operational support, the Strat J4 Capability Development Framework that has yet to migrate to any defence publication due to the infancy of the directorate which stood up in 2014, has aimed to seek out innovation from both private industry and other nations defence sectors.⁴⁶ Linked with other defence organizations involved in innovation, including the ABCA Futures Working Group, Strat J4 aims to host a Strat J4 innovation working group by the end of 2017. During this forum the Directorate will discuss the many innovations that are currently being tracked including hybrid airships for transportation, sustainment and ISR, meta materials, reduced logistics footprint, exoskeletal development and wearable

⁴⁴ Log Branch Campaign Plan, 2016-2020 – available on DWAN through Logistics Branch Intranet website

⁴⁵ Operational Support Capability Development Continuum – unpublished but released from LCol Steph Roussel Operational Support Capabilities Development Team Leader, Strategic Joint Staff – Strat J4 released to author as part of solicitation for this study

⁴⁶ Comment taken from conversation with Maj Tricia Travers, Operational Support Capabilities Development Analyst, Strategic Joint Staff

technology, unmanned ground vehicles, predicative analytics and RFID.⁴⁷ Each innovation in this domain represents a significant departure from how the CAF sustains and maintains operations and is indicative of the positive direction that logistics innovation is moving towards the future. Time will tell if the initiatives discussed gain traction, funding and interest amongst other level one organizations.

The RAND requirement for a driver is met with the creation of a strategic J4 in SJS and clearly defined mandate to investigate logistics innovation. Part of their mandate stems from Defence Renewal, which directs the Directorate to continue to review ways in which logistics functions are being delivered in various organizations in the CAF with an eye to identifying best practices that could streamline processes across the department. This is a positive first step to improved logistics change initiatives in the future. Additionally seeking out new applications for technology within logistics from other defence agencies and from the civilian sector serve to promote knowledge, as often this is where the provision of expertise lies.

A second innovation initiative has been applied within the RCAF with the introduction of an Innovation cell in the Canadian Forces Aerospace Warfare Center (CFAWC). Using a crowd sourcing inbox to compile suggestions for the air force community, the Innovation Tracker is an entry-level tool aimed at collaboration between individuals with great ideas and commanders who can implement those ideas. This tool is used to gather and discuss ideas to improve pan-RCAF processes and can be accessed by all RCAF personnel⁴⁸. While a review of the tracker did not indicate any logistics

⁴⁷ Discussion with LCol Steph Roussel Operational Support Capabilities Development Team Leader, Strategic Joint Staff – Strat J4 Canadian Armed Forces

⁴⁸ Canadian Aerospace Warfare Center. “Innovation Tracker,” last accessed 05 May 2017 <http://w08-ttn-vmweb01/CFAWC/en/innovation.asp>

specific suggestions or comment threads from CFAWC, of particular note was a call for a cell within the RCAF that reaches out to all Innovation Centres, University Centres of Excellence, and Industry organizations that promote collaboration and innovation.⁴⁹

One can draw two conclusions from the content of the Innovation tracker. Firstly, comments suggesting that the RCAF as a whole, not just the discipline of Logistics, does not leverage the resources that exist in the civilian sector. Secondly, the lack of input pertaining to logistics rests on the fact that the forum is aimed at issues that can be addressed through the RCAF chain of command. As logistics is fundamentally a purple trade that spans the Canadian Army, Navy and Air Force, suggestions for proposed areas of development and research in the professional of logistics would be better addressed through the Strategic J4. Similar 'crowd sourcing' forums would allow for ideas to further enhance operational support initiatives, service delivery and logistics.

CONCLUSION

Defence logistics has ground to make up to match both the culture and the implementation of innovative solutions applied in corporate logistics against supply chain management and distribution challenges. Solutions that have now become common place in the operating environment of the civilian corporate world are still line items on spreadsheets within the department of defence. To take a glass half full approach to this lag, there are time tested, researched and viable solutions to issues that are cost and labor saving, digitally safe and secure, and process effective and efficient that are in practice right now and by nature of their use with the field, require less investment, less risk and

⁴⁹ Ibid

less time to implement. This paper has demonstrated that there are commonalities between Defence and private sector logistics that make information sharing and idea exchange mutually beneficial and should be pursued with rigor. This engagement from defence in the corporate sector demands reform in both the culture within the Logistics directorate and in DND in general.

Innovation such as drone delivery, semi-autonomous driverless vehicles, and 3D printing sit on the cusp of being accepted as common place as consumer awareness for this technology is reaching mainstream through companies like Uber and Amazon. However, many advancements like RFID that were once futuristic and innovative are either now standard operating procedure or are being usurped by advances exemplified by the internet of things. Seemingly, DND has missed an entire generation of technology as it failed to look forward beyond the battlespace of yesterday.

Lean solutions in the field of logistics must be pursued that would see percolation of new ideas that promote Logistics systems that are Resilient, Robust, Transparent, Flexible and Secure. The key factors of innovation and diffusion provided from RAND and Rogers serve as both a model by which policy can be used to address innovation from a resourcing perspective and also provide a litmus test against where we can improve the existing culture, focus and define drivers and improve the existing communication systems. None of these improvements can be done before we address the overall culture within the Logistics community.

As governments call for systems of increased accountability and demand real time access to information, initiatives in Total Asset Visibility and supply management need the boost that technology can offer. With the creation of the Strategic J4 and the linking

of the Logistics Branch Integrator within SJS the branch is better aligned to voice capability development requirements and to offset the anomaly that the Logistics Branch was not functionally managed by a service or managed by an L1. The formal identification of an innovation line of effort is an indication of the positive cultural change that is occurring within the branch. In line with the adage that change is a process not an event, these are the steps necessary that will allow logisticians to look beyond the horizon in aim to deliver service second to none.

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