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UNLOCKING POTENTIAL: DELINKING COMMUNICATION INFORMATION SYSTEMS PROCUREMENT FROM MAJOR CAPITAL PROJECTS

Maj Peter Williams

JCSP 44

Exercise *Solo Flight*

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Maj Peter Williams

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Acquisition Reform, as it is generally known, is a subject only about 5 minutes younger than the acquisition of military equipment itself.

- Bernard Gray, *Review of Acquisition for the Secretary of State for Defence*

INTRODUCTION

Modern professionals are more effective and productive resulting from access to knowledge and tools available via smartphones and tablets; unfortunately, members of the Department of National Defence (DND) and Canadian Armed Forces (CAF) are not afforded the same modern tools. Dated and bureaucratic defence procurement policies restrict the ability of DND to purchase the modern tools that are standard equipment in many other industries. Each stalled Communication Information System (CIS) procurement initiative results in decreased productivity in DND and CAF. Recent procurement reforms have yet to relieve the procurement backlog of CIS equipment, which are considered "…widely distributed and relatively low value items…" in any other organization.[1]

Studies on the distribution of CIS equipment in the modern workplace indicate that access to CIS improves the effectiveness of government, promotes innovation, and grows economies. The proliferation of end-user CIS devices increases the effectiveness of government by streamlining processes and administration to provide consistent delivery of public services.[2] The pharmaceutical industry capitalizes on the collaboration and knowledge-sharing that CIS

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[1] Al Hamel, *De-Linking COTS IT Equipment from Major Capital Projects,* 19 1525 April 2018 email.

[2] Australia, *Connecting Governments: Whole of Government Responses to Australia's Priority Challenges*, Canterbury: Management Advisory Committee, 2004. 6.

enables, resulting in a measurable increase in productivity and innovation.[3] Lefley's comparison of capital investment in CIS systems between the United States and Europe identify that the lack of investment by European firms has resulted in their economies comparatively underperforming by five percent, or €760 Billion.[4] Access to CIS equipment provides a return on investment that creates tangible and competitive advantages for government, innovation, and economic growth.

The lack of progress in defence procurement reform results in DND and CAF organizations that are not only less efficient, but also are less effective than they should be. National Defence is the largest discretionary expenditure of the Canadian Government, so this inefficiency causes DND to expend unnecessary funds in the conduct of the department's corporate administration. Militaries such as CAF strive to be as effective as possible, as this maximizes the chances for success in a military campaign; an ineffective military is less likely to be successful on operations and thus creates a risk to national sovereignty. This paper will examine the pace of innovation, recent Canadian defence procurement reforms, allied defence procurement policy, and DND's procurement and material management, demonstrate that end-user CIS devices have become consumable items, and that Government policy supports excluding their purchase from the rules for Major Capital Projects.

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[3] Landon Kleis, Paul Chwelos, Ronald V. Ramirez and Iain Cockburn, "Information Technology and Intangible Output: The Impact of IT Investment on Innovation Productivity," *Information Systems Research Vol 23 Issue 1*, Hanover: Institute for Operations Research, 2012. 43-55.

[4] Frank Lefley, "The Appraisal of ICT and non-ICT Capital Projects: A Study of the Current Practices of Large UK Organizations," *International Journal of Managing Projects in Business*. *Volume 6, Issue 3(2013),* Bingley: Emerald Group Publishing, 2013

COMMUNICATION INFORMATION SYSTEMS PROCUREMENT

Pace of Innovation

Military research and development has historically led technological innovation; however, in the information age, the civilian sector is outpacing the military as the driver of innovation. Companies such as Apple, Samsung, and Google rely on innovation to give themselves a competitive edge and guarantee their relevance in the mobile device industry.[5] These companies adapt and reinvent themselves through the adoption and implementation of technological innovations, maintaining their market share which allows them to lead future development. "What is noteworthy is the change of pace does not seem to be abating."[6] The following section will examine the success of Apple, Samsung, and Google in leading technological innovation to establish and maintain their status as dominant players in the end-user CIS device market, and how outdated defence procurement policy is failing to capitalize on modern innovation.

Apple

The release of Apple's iPhone in 2007 revolutionized the smartphone industry. Prior to 2007, Blackberry and Palm/HP dominated the smartphone market.[7] The iPhone's touch-screen brought the Internet experience to mobile users in a format that had previously only been

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[5] Tsitaire Jean Arrive, "An Analysis of the Impact of Innovation on the Competitiveness of Smartphone Manufactures," *International Journal of Management Research and Review Vol 7 Issue 9*, Bhopal: International Journal of Management Research and Review, 2017. 872.

[6] Ross Fetterly, *Defence Procurement Reforms in Other Nations,* Kingston: Queens University, 2009. 35.

[7] Denis Lescop and Elana Lescop, "The Apple Twist," *Communications and Strategies Number 102, 2nd Quarter*, Montpellier: Institut de L'Audiovisuel et de Telecommunications en Europe, 2016. 29.

accessible through a computer.[8] The launch of the Apple App store in 2008 further revolutionized the market by introducing third-party applications for smartphones. By 2012, users had downloaded 30 billion applications from the App Store and Apple earned half of the smartphone industry's profits despite iPhone owners only representing one-fifth of active smartphone users.[9] Apple continued to surprise the consumer market with innovation by releasing the iPad in 2010.[10] The larger screen size enabled a wider array of user applications and quickly became a favourite tool for professionals.[11]

Apple uses a reduced cycle development time and incremental innovation to consistently and regularly update their product line with the latest capabilities, releasing a new product every 12 to 18 months. Apple is constantly updating their operating system, from iPhone OS 1.0 released in 2007 to iOS 11.3, available as of April 2018. Each new release adds more capabilities and features to Apple's line of mobile devices.[12]

Apple's venture into the mobile telecommunication industry turned the tables on the existing cellular service providers and smartphone manufactures. The iPhone's touchscreen capabilities and the possibilities that the application market provided users and third-party developers left the established order scrambling to catch up. The newly expanded smartphone segment enticed a significant array of newcomers into the end-user CIS device market.

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[8] B. Dambal Bowonder, Kumar Shambhu Anirudha, and Abhay Shirodkar, "Innovation Strategies for Creating Competitive Advantage," *Research Technology Management Volume 53, Issue 3*, Arlington: Industrial Research Institute Inc., 2010. 28; Denis Lescop and Elana Lescop, "The Apple Twist,"… 27.

[9] Denis Lescop and Elana Lescop, "The Apple Twist,"… 26-27.

[10] Apple, "Identify your iPad model," Cupertino: Apple Inc., 2018.

[11] Casey Meeks, "The Aviation Industry Looks to Mobile Technology to Streamline Operations," *insights*, San Jose: Samsung, 2016; Denis Lescop and Elana Lescop, "The Apple Twist,"...31.

[12] Apple, "iOS 11.3 is Available Today," Cupertino: Apple Inc., 2018.

Samsung

Samsung has been the most successful traditional cellular phone manufacturer to expand into the smartphone and tablet segment.[13] Following the success of the iPhone, Samsung chose to adopt Google's Android OS for its own line of smartphones, releasing the Galaxy S in 2009.[14] Samsung's key to success as a smartphone producer is adaptation, incorporating popular trends and features into its phone lines and dropping failures.[15] Their willingness to offer unconventional capabilities and features has seen 34 variants of the Galaxy line released up to February 2018 and this mindset has firmly established Samsung's positon as the dominant competitor to Apple.[16] The Tab and Note lines further demonstrate Samsung's ability to adapt to consumer preferences. Capitalizing on a niche market demand, Samsung developed the Note for "Asian-language speakers [that] in particular wanted a device that they could hand-write on, because drawing characters is easier with a pen. The result was a combination phone/tablet ("phablet") that's been an unexpected hit."[17]

Samsung also employs reduced cycle development timeline and incremental innovation to keep their product line fresh and relevant to consumers. This has resulted in a steady stream of new products that incorporate the most recent trends, correct previous glitches, and eliminate unpopular features. Consumers have rewarded this formula with strong sales, making Samsung the world's largest smartphone manufacturer.

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[13] Timo O. Vuori and Quy N. Huy, "Distributed Attention and Shared Emotions in the Innovation Process: How Nokia Lost the Smartphone Battle," *Administrative Science Quarterly Vol 61 (1),* Ithaca: Johnson College of Business, Cornell University, 2016. 15.

[14] Timo O. Vuori and Quy N. Huy, "Distributed Attention…15; Samsung, "Samsung Galaxy S," San Jose: Samsung Group and Samsung Electronics, 2018.

[15] Max Nisen, "Samsung has a Totally Different Strategy from Apple, and it's Working Great," *Business Insider*, New York: Business Insider Inc., 2013.

[16] Max Nisen, "Samsung has a Totally Different Strategy…; Samsung, "Samsung Galaxy S,"…

[17] Max Nisen, "Samsung has a Totally Different Strategy…

Google

Google leveraged its software expertise to develop Android, a Linux-based operating system, which quickly became favored among hardware manufacturers and third-party application developers alike.[18] The adoption of Android by Samsung resulted in a profitable relationship that enabled both companies to gain a dominant foothold in the smartphone market. Unlike Apple's iOS, Android is a non-proprietary operating system in which Google has integrated their web browser, search engine, map, and email service, which affords both handheld manufacturers and telecommunication service providers the ability to customize the operating system for their phones.[19] Google consistently updates Android, producing 14 major releases and 27 Application Program Interface updates from the initial unnamed Android 1.0 "beta" in 2007 through to the current Android 8.1.0 "Oreo."[20]

The incremental innovation employed by Apple, Samsung, and Google has been difficult for militaries to capitalize on. "Rapid technology changes, yielding obsolescence, have become particularly problematic for very large systems with acquisition life cycles spanning a long period of time."[21] Incremental innovation permits smartphone manufacturers to reduce their development cycle to less than two years, which is far shorter than the typical military project development cycle of eight to 10 years.[22] The pace of innovation and obsolescence, specifically for end-user CIS devices, such as smartphones, tablets, and laptops, has seen CIS become a

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[18] Timo O. Vuori and Quy N. Huy, "Distributed Attention…15.

[19] B. Dambal Bowonder, Kumar Shambhu Anirudha, and Abhay Shirodkar, "Innovation Strategies…22.

[20] "Codenames, Tags and Build Numbers," Mountain View: Google LLC, 2018; Android development happens around families of releases that use code names ordered alphabetically after tasty treats.

[21] John T. Dillard, "Towards Centralized Control of Defence Acquisition Programs," *Defence Acquisition Journal Review, Volume 12, Issue 3*, Fort Belvoir: Superintendent of Documents, 2005. 332.

[22] Michelle Jones, "ValueWalk: Apple Inc. Outspending Major Automakers on R&D By 20 Times," *Newstex Global Business Blogs*, Chatham: Newstex LLC, 2016; Canada, *2017 Defence Renewal Annual Report: Realizing the Opportunity*, Ottawa, Department of National Defence, 2017. 13.

consumable item rather than a capital asset. The consumable nature of CIS devices necessitates that a new approach be taken with regard to their procurement.

Recent Canadian Defence Procurement Reform

The 2014 Defence Procurement Strategy reformed defence procurement based on recommendations from the Jenkins report.[23] The 2017 federal budget introduced procurement reforms based on feedback from several departments. The reforms included creating the Defence Procurement Secretariat, implementing a Value-Proposition criteria for evaluating bids, increasing DND's procurement authority, and reinstating delegation for federal departments to procure CIS equipment without requiring Shared Services Canada's direct involvement.

The purpose of the Defence Procurement Secretariat is to better coordinate procurement and increase accountability by involving senior public servants from all the departments involved in the process so that timely decisions will be made.[24] The new process adds layers of bureaucracy from the previous one and requires the ministers from a minimum of five federal departments to come to a consensus on procurement of high-value, complex, military capabilities.[25] Additionally, a Deputy Minister's Guidance Committee was created to vet the procurement files for their respective ministers.[26] Michael Den Tandt, a political columnist for *The National Post*, is skeptical of the Defence community's intentions regarding defence

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[23] Canada, *Defence Procurement Strategy,* Ottawa: Public Services and Procurement Canada, 2016.

[24] Jim Quick, "Procurement Strategy Solves Problems," *Montreal Gazette*, Montreal: Montreal Gazette, 2017.

[25] Ugurghan Berkok, "Canadian Defence Procurement," *Defence Procurement and Industry Policy – A Small Country Perspective*, New York: Routledge, 2010. 211-213;The Defence Procurement Secretariat, at minimum, includes the Ministers from Public Service and Procurement Canada as the Chair, National Defence, International Trade, Fisheries and Oceans, and Innovation, Science and Economic Development. Any ministers that may have an interest due to the procurement being discussed would also be invited on a case-by-case basis.

[26] Canada, "Streamlined and Coordinated Decision Making," Ottawa: Public Services and Procurement Canada, 2016.

procurement, arguing against increasing DND's procurement authority. Den Tandt points to a "culture at DND that, with stunning tenacity, simply will not accept that mind-bogglingly expensive weapons purchases must be subject to an open, transparent, competitive - yet still efficient - bidding process."[27] The addition of the Defence Procurement Secretariat has checked DND's ambitions, as the addition of multiple layers of bureaucracy has yet to create tangible progress in the realm of Canadian defence procurement since 2014.

The Defence Procurement Strategy introduced Value-Proposition criteria to evaluate bids on defence contracts. Value-Proposition uses weighted and rated criteria that assess price, technical merit, and economic activity undertaken by the bidder in Canada.[28] Value-Proposition is intended to use defence procurement to stimulate economic growth and develop the Canadian military-industrial complex. Jim Quick, Chief Executive Officer of Aerospace Industries Association of Canada, believes that Value-Proposition is the superior method for assessing bids. Quick's argument is that it prefers bidders "who provide the best value at the lowest price," which "should make the inclusion of Canadian benefits more competitive than before, not less so."[29] However, a 2011 assessment by Statistics Canada on research and development in Canada identified that the computer and electronic manufacturing sector re-invested 31 percent of their profits into research and development in Canada.[30] Additionally, the Jenkins report recommends an exemption for the purchase of commercial-off-the-shelf products due to its small potential to stimulate the economy through innovation.[31] Regardless of the limited innovative investment in Canada commercial-off-the-shelf end-user CIS devices hold, the Statistics Canada data indicates

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[27] Michael Den Tandt, "At DND, Kenney faces greatest challenge: Good Luck trying to fix Canada's giant military procurement mess," *The Windsor Star.* Windsor: The Windsor Star, 2015.

[28] Canada. "ITB Policy: Value Proposition Guide: Industrial and Technological Benefits." Ottawa: Innovation Science and Economic Development Canada, 2018

[29] Jim Quick, "Procurement Strategy Solves Problems,"...

[30] Canada. Beyond the Horizon: Canada's Interest and Future in Aerospace. Ottawa: Public Works and Government Services

[31] Canada, *Canada First*... 26.

that Canadian firms would score high in Value-Proposition criteria if they were to bid on such a contract. Therefore, applying Value-Proposition criteria to these devices becomes a bureaucratic hurdle that would result in negligible additional economic investment in Canada.

Public Services and Procurement Canada (PSPC) is investigating how to increase DND's delegated procurement limits from the existing $25,000 to increase defence procurement efficiency.[32] The rationale behind the increase is an "increased efficiency in the purchase of goods of lower value and complexity by reducing the transaction overhead cost of working between two departments."[33] However, it has been over four years since PSPC launched its investigative efforts and DND's procurement limit remains at $25,000.

The most recent change to Government procurement policy was introduced in the 2017 budget, permitting ministers to opt-out of using Shared Services Canada for delivery of their department's information technology services.[34] The budget allows departments to opt-out of Shared Services Canada network services and provide their own network services internally. The budget enables departments to "purchase products through SSC from a list of standing offers, much like the former delegation system" when these standing offers were held by Public Works and Government Services Canada.[35] Shared Services Canada had been interjected into the procurement process as an under-resourced middle man. This added layer of bureaucracy impeded the procurement process due to Shared Services' lack of capacity to process the high-

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[32] Canada, *Defence Procurement Strategy…*

[33] Canada, *Increased Authority for National Defence to purchase defence supplies*, Ottawa: Public Services and Procurement Canada, 2016.

[34] Canada, *Budget Implementation Act, 2017, No 1,* Ottawa: Minister of Finance, 2017. 71-73; Shared Services Canada was launched by the former Conservative government in 2011 with the responsibility of delivering email, data centre, and network services in a "consolidated and standardized manner. They have been heavily criticized by other government departments for failing to deliver on Information Technology initiatives or realize savings.

[35] Canada, "Shared Services Canada Procurement Delegation," Ottawa: Shared Services Canada, 2017; Public Works and Government Services Canada was renamed Public Services and Procurement Canada in 2015.

volume of work and procurement required by 43 other government departments. The changes introduced by the budget bill will improve the procurement process for end-user CIS devices.

The procurement reforms introduced by the Defence Procurement Strategy have not been successful at streamlining defence procurement. The creation of the Defence Procurement Secretariat has not hastened decision-making on defence procurement files and the proposed increase to DND's procurement authority has not been realized. The inclusion of Value-Proposition criteria is unlikely to have an impact on bids for end-user CIS devices due to their limited potential to promote additional innovation. The reinstatement of access to federal National Master Standing Offers for CIS devices should restore the independence that departments enjoyed prior to the existence of Shared Services Canada.

DND Procurement and Material Management

DND strives to provide the military with the best equipment possible within the framework of the Government's strategic and economic ambitions.[36] This section will review unfulfilled CIS capabilities for the Canadian Special Operations Command (CANSOFCOM) and RCAF to assess how procurement is affecting their implementation. This will be followed by a review of DND's *Policy on Management of Material* and *Canadian Supply Manual* as they pertain to end-user CIS devices.

The CANSOFCOM Defence Acquisition Guide lists the requirement for "Secure Mesh, Self-Forming Mobile Ad-Hoc Networks"[37] These networks would consist of smart devices, such

[36] Canada, *Policy Management of Information Technology*, Ottawa: Treasury Board, 2018.
[37] Canada, *Special Operations Forces Defence Acquisition Guide 2016*, Ottawa: Department of National Defence, 2016.

as smartphones and tablets, employing third-party software to establish and secure mesh networks. To ensure maximum flexibility and reduce risk of compromise, these networks should be built using new devices running up-to-date operating systems and applications. The use of cutting-edge technology and software minimizes the risk of hardware and software exploits that can be used by an adversary to intercept the data being passed or compromise devices. The rapid obsolescence of CIS devices and applications complicates defence procurement due to the incompatible nature of defence versus commercial product development timelines. For DND to take advantage of cutting-edge commercial-off-the-shelf smartphones, tablets, computers, and software applications, the procurement of CIS must be treated differently than other capital procurement initiatives.

RCAF aircrew have a legal requirement to replace aeronautical publications that provide "aeronautical information related to the arrival or departure portions of flight instrument approach procedures, standard instrument departure procedures, and noise abatement procedures."[38] RCAF aircrew currently carry hard copies of aeronautical publications which consist of eight volumes, weigh 50 pounds, and must legally be replaced every 56 days.[39] The demand for Electronic Flight Bags to replace hard copy aeronautical publications led the Federal Aviation Administration to release Advisory Circular 120-76B in 2012, which outlined the regulations and guidelines for the replacement of hard copy aeronautical publications with soft copies on tablets.[40] The convenience of carrying, using, and updating aeronautical publications on an Electronic Flight Bag quickly resulted in tablets being the preferred method for viewing

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[38] Canada. *Canadian Aviation Regulations SOR/96-433*. Ottawa: Minister of Justice, 2017. 474; "Aeronautical Publication," Ottawa: Nav Canada, 2018.

[39] Casey Meeks, "The Aviation Industry…

[40] United States Department of Transport, *Advisory Circular 120-76B*. Washington: Federal Aviation Administration, 2012.

aeronautical publications in the aviation industry.[41] However, due to the dollar value of providing tablet Electronic Flight Bags to aircrew, current procurement spending limits continue to hamper the adoption of Electronic Flight Bags in the RCAF.

DND employs the *Policy on Management of Materiel* with the objective of managing material purchased with public funds "in a sustainable and financially responsible manner that supports the cost-effective and efficient delivery of government programs."[42] Material lifecycle management considers "the total life-cycle costs (e.g. of forecasted use, modifications, conversions, repairs, and replacement)" and "procurement of off-the-shelf assets, which may greatly reduce costs overall" over custom-made items.[43] The *Canadian Supply Manual* recognizes the unique nature of CIS equipment with the recommendation for "a centre of expertise (COE) for the procurement of specific common assets such as computers, cellphones, and BlackBerrys"[44] Additionally, PSPC has deferred the quality assurance of equipment and systems designed for military applications to DND.[45] These documents clearly outline established Canadian procurement policy for commercial-off-the-shelf devices which would alleviate Den Tandt's concerns of any nefarious intent by DND officials to circumvent policies to obtain and employ end-user CIS devices for operational purposes. The acknowledgement in these documents should be used as a precedence to apply unique procurement rules for end-user CIS devices. Government policy for the lifecycle management of end-user CIS devices should be updated to reflect their relatively short lifespan, permitting frequent replacement of these assets with recent, more capable devices.

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[41] Casey Meeks, "The Aviation…

[42] Canada, *Guide to Management of Material,* Ottawa: Treasury Board, 2011. 2.

[43] *Ibid,* 14.

[44] *Ibid*

[45] Canada, *Supply Manual Annex 1.1.2.2 Section B: Division of Responsibility between PWGSC and DND for the Quality Assurance of Material and Services,* Ottawa: Public Services and Procurement Canada, 2015.

The limited volume of equipment that would be required to fulfill CANSOFCOM's desired "Secure Mesh, Self-Forming Mobile Ad-Hoc Networks" may allow for this capability to be fielded using current procurement policy. However, the same procurement policies are prohibitive to a pan RCAF rollout of Electronic Flight Bags due to the large number of aircrews in the RCAF. The *Policy on Management of Material* and *Canadian Supply Manual* set precedence for applying unique procurement rules for end-user CIS devices which justifies modernizing lifecycle management practices to reflect their relatively short lifespan and consumable nature.

Allied Defence Procurement Policy

To assess the effectiveness of Canadian defence procurement reform, it is useful to compare Canadian and Allied procurement policies. The following section will look at reforms adopted by Australia and the United States.

Australia has updated devolved spending authority to reflect the costs of modern defence capabilities. Their *Commonwealth Procurement Rules* separate purchases into three categories: simple, complex, and strategic.[46] Procurement of simple and complex initiatives is devolved to departments. For complex procurements in excess of $2 Million, Capability Acquisition and Sustainment Group Cost Principles are to be applied. However, provided the purchase falls within a "reasonableness test", the authority to procure continues to reside within the responsible department.[47] This increase in procurement authority is likely the most beneficial difference between the Canadian and Australian systems. The development and procurement of advanced

[46] Australia, *Commonwealth Procurement Rules*, Canberra: Department of Finance, 2018.

[47] Australia, "CASG Cost Principles," *Defence Procurement Policy Manual*, Canberra: Department of Defence, 2017.

capabilities is problematic when using procurement limits that were set several decades ago due to the modern proliferation of CIS equipment and the effects of inflation on costs. Updating the procurement policies to reflect current realities would improve DND's ability to purchase the CIS tools required of a modern military.

The United States is assessing a modular approach to the management of the advanced sub-systems in its defence platforms as it is acknowledged "that innovation evolves at different rates. A modular approach not only helps contain costs, but also ensures a long useful lifetime for the platform."[48] A modular approach is a cost effective means to extend the life of defence capabilities, while integrating new functionality and emerging technologies. The modular approach was recommended in the Jenkins report for Canadian defence procurement and could be applied to the procurement of end-user CIS devices.[49]

The Australian *Commonwealth Procurement Rules* simplify and devolve procurement, allowing for straight-forward defence procurement to be conducted at the lowest level, thereby eliminating unnecessary bureaucracy. The modular approach being contemplated by the United States would simplify product definition while also allowing for a cost effective method to upgrade and extend the life of existing capabilities. Both of these reforms would be beneficial if incorporated into Canadian defence procurement policy.

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[48] Canada, *Canada First: Leveraging Defence Procurement Through Key Industrial Capabilities*, Ottawa: Public Works and Government Services Canada, 2013. XIV.

[49] The Jenkins report is formally known as *Canada First: Leveraging Defence Procurement through Key Industrial Capabilities.*

Recommendation

Defence procurement is a complex issue, consisting of many competing priorities beyond the consideration of tactical level commanders and operators. There is no easy solution to address all of the factors that complicate defence procurement; however, resolving a few of the more simple issues surrounding procurement can reduce the backlog of procurement initiatives, allowing senior management to focus on the more intricate aspects of defence procurement. Recommendations to address minor issues with procurement include acknowledging that modern commercial-off-the-shelf end-user CIS devices are consumable items, adoption of a modular approach for updating technological capabilities, and increasing devolved procurement authorities.

Incremental innovation permits smartphone manufacturers to reduce their development cycle to less than two years, which is far shorter than a typical military project development cycle of eight to 10 years.[50] This pace of innovation has seen end-user CIS devices evolve from once being considered capital assets to now being consumable items with relatively short life expectancies. This is a view shared by Al Hamel, an Acting Director General with PSPC, who states "…"[commercial-of-the-shelf information technology]" is recognized as small, portable, widely distributed, and relatively low value items, what we could think of as end-user items (smart phones, tablets, etc.)."[51] Furthermore, the Jenkins report recommends exempting commercial-off-the-shelf products from the Value-Proposition evaluation due to their small potential to stimulate the economy.[52] Treating end-user CIS devices as consumables would allow

[50] Michelle Jones, "ValueWalk…; Canada, *2017 Defence Renewal …*13.
[51] Al Hamel, *De-Linking COTS IT Equipment …*
[52] Canada, *Canada First…* 26.

their purchase to be excluded from the rules that apply to Major Capital Projects and thus would eliminate the double standard currently being applied to their procurement.

Adopting a modular approach to the lifecycle management of CIS equipment would lead to increased functionality and performance, increased protection, and would protect against shifting priorities. Applying a modular approach to project design would allow for incremental evolution of individual components within complex military assets, such as a deployable communications suite or an Electronic Flight Bag. This would allow the individual components of said capabilities to be incrementally upgraded, increasing functionally and performance. The risks associated with the capability development timeline would be reduced and ensure that operators are provided with the most effective product.[53] A modular upgrade of devices allows for the greater protection against emerging vulnerabilities which "is essential to protecting the lives of military personnel deployed in hostile environments."[54] The modular approach to lifecycle management allows for hedging against competing priorities, as the military would still have a functional product should planned increments be delayed or cancelled due to a change in priorities.[55] The adoption of a modular approach to CIS equipment lifecycle management would lead to increased functionality and performance, increased protection, and would hedge against shifting priorities.

An increase in delegated procurement authority is required to improve the efficiency of procurement, allowing for the modular lifecycle of equipment, and increase the value-for-money. Increasing the limits of delegated procurement authority is the most effective way to improve procurement efficiency. This is a measure that has been implemented by Australia and should be

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53 John T. Dillard, "Towards Centralized Control…333.
54 Ross Fetterly, *Defence Procurement Reforms…*45.
55 Ross Fetterly, *Defence Procurement Reforms…*48.

followed by Canada as soon as possible to relieve the strain on the procurement system. Increased procurement authority would also permit the modular refresh of existing capabilities, thereby increasing their effectiveness and extending their lifespan. Modern spending limits would reduce the required oversight of defence procurements, reduce administrative overhead costs, and thus increase the value-for-money in procurement of low-value end-user CIS equipment.[56] The efficiencies realized by increasing delegated procurement authorities would make available funding that could be directed towards initiatives that have greater potential for Value-Proposition, thus creating the economic opportunities desired by Quick and his associates. Increasing the delegated procurement authority would lead to improved procurement efficiency, enable the modular lifecycle of equipment, and increase the value-for-money of defence procurement.

Recognizing that modern commercial-off-the-shelf end-user CIS devices are consumable items, implementing a modular approach to updating technological capabilities, and increasing the devolved procurement authorities would resolve some of the simpler issues with procurement. Implementing these measures would reduce the backlog of procurement initiatives and enable senior management to focus their efforts on resolving defence procurement's more intricate challenges.

CONCLUSION

The relative efficiency of DND in conducting defence administration and the effectiveness of CAF at providing military effects are a direct result of the Canadian defence

[56] Paul R Schapper, Joao Veiga Malta, Diane L Gilbert, "An Analytical Framework for the Management and Reform of Public Procurement," *Journal of Public Procurement Volume 6, Issue ½*, Boca Raton: PrAcademics Press, Florida Atlantic University, 2006. 6-7.

procurement process. Productive procurement reform would have positive effects, providing increased defence capability while enhancing economic benefits from Government funding allotted to the defence budget. This would allow CAF to increase not only its effectiveness and efficiency, but also its success at achieving the Government's strategic objectives of promoting peace and security, and garnering goodwill with our NATO and NORAD allies.

The examination of the pace of technological innovation, recent Canadian defence procurement reforms, allied defence procurement policy, and DND's procurement and material management reveal several measures that could be modified to facilitate the procurement of end-user CIS devices. The current Canadian defence procurement policies result in DND and CAF battling obsolescence instead of simply upgrading individual obsolete components with new and more capable technology. Reclassifying modern commercial-off-the-shelf end-user CIS devices as consumable items would allow their exclusion from the policies that apply to Major Capital Projects and Value-Proposition assessment. Adopting a modular approach to the refresh of technological capabilities would allow for incremental upgrades to CIS capabilities and relieve DND from the burden of managing antiquated hardware and software. This, in turn, would provide commanders and operators with productive, reliable, and secure communications needed to achieve their desired military effects. An increase in the devolved procurement authorities would be the simplest and most effective way to resolve the backlog of procurement initiatives by permitting low-value and low-risk procurements to be completed within DND. These measures would not resolve the complex issues surrounding defence procurement in its entirety, but it would relieve some of backlog on the system by removing the backlog of CIS equipment.

Updating defence procurement and material management policies would enable DND to purchase modern tools that are standard end-user CIS devices in many other industries. These

CIS devices would increase the productivity and effectiveness of DND and CAF by allowing them to adopt many of the best practices employed by civilian industries. It is possible to implement these minor reforms to defence procurement, while both meeting the Government's defence procurement goals, and unlocking the unrealized potential of the CAF.

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