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Accelerating the Canadian Army's Digital Transformation

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ACCELERATING THE CANADIAN ARMY'S DIGITAL TRANSFORMATION

AIM

1. The aim of this service paper is to provide context and propose solutions to accelerate the implementation of digital transformation within the Canadian Army (CA). It will inform the CA digital transformation leadership the importance of implementing a product management approach and enabling innovation at the edge. This service paper will provide recommendations on key initiatives that should be initiated to kickstart this proposal.

INTRODUCTION

2. *Strong Secure Engaged* (SSE) identifies that rapid technological advancement within the area of data analytics, information technology and cyber will “change the fundamental nature of military operations”¹. The *Pan-Domain Employment Concept* (PFEC) recognize a significant change in the approach to integrate joint capabilities, and their heavy dependency on the information, cyber and space domain. The Canadian Army’s capstone document *Close Engagement* and *Canadian Army Modernization Strategy* both highlight the need to integrate and exploit the use of emerging technology to remain effective² as a force within the PFEC. This effectiveness will be dependent on our ability to accelerate our decision-making process, and integrate various digital technologies such as artificial intelligence, big data analytics and automation³. These capabilities will be highly reliant on a modernization of our C4ISR systems, a key pillar of our “shoot, move, communicate” approach⁴. These systems will require to support an ever-increasing demand for data collection, processing, and analysis. Hence, the intersection of emerging technology, a modern infrastructure and a skilled digital workforce will be foundational to succeed its digital transformation ambitions.

3. However, the implementation roadmap within the *Canadian Army Modernization Strategy* has a phased approach. It prioritizes the modernization of its C4ISR infrastructure (2020-2025) and then the establishment of a digital army with the operationalization of data analytics (2025-2030)⁵. Although methodical, this approach has a risk in its ability to gain momentum and readjusts the strategy over time. C4ISR systems are non-arguably the backbone of a transformation but should always be adapted to support our business needs. Taking a technology-first approach has a risk of misalignment between the user’s need and the technology. It is often difficult for an

¹ Department of National Defence, *Strong Secure Engaged: Canada’s Defence Policy*, (Ottawa, 2017), 55

² Department of National Defence, *Advancing with Purpose: The Canadian Army Modernization Strategy* (Ottawa, 2020), p.22

³ *Ibid.*

⁴ Major-General C.J.J. Mialkowski, “Modernizing for future conflict,” *Canadian Army Today*, 16 January 2021. <https://canadianarmytoday.com/modernizing-for-future-conflict/>

⁵ Department of National Defence, *Advancing with Purpose: The Canadian Army Modernization Strategy* (Ottawa, 2020), p.22

organization to identify the scope, the size and the timeline of its digital transformation. We want to modernize, but we do not necessarily know how to implement it. Nevertheless, the army's modernization horizons should happen simultaneously instead of phases, and it should adjust its objectives iteratively as it gains a better understanding of the end state to be achieved.

4. This service paper will investigate how the CA can accelerate its digital modernization by taking tangible action in the short term. It will (1) identify potential digital domain to explore, (2) discuss the importance of enabling agile product development at the edge, and (3) discuss the constraints of early governance framework and policy. Finally, four recommendations will be presented to support this proposal.

DISCUSSION AND ANALYSIS

5. Digital Transformation can be generalized as the various initiatives to modernize digital technology to support the creation or modification of business processes to meet changing business and market requirements⁶. It includes "anything from IT modernization, digital optimization, to the invention of new digital business models"⁷. Technologies, tools, and methods such as data analytics, artificial intelligence, big data architecture, robotics, DevOps, and Agile software development can all be sub-component of a digital transformation program⁸.

6. In the CA, most of the digital transformation ambition revolves around the ability for commanders and their staff to make rapid and informed decision-making. Thus, operationalizing data analytics has been a key objective of the CA and the CAF in general. Out of the various definitions of data analytics, Smith School of Business professors Alex Scott and Keith Rogers provides a simple one: "using data to gain insight or drive action"⁹. What differentiates a digitally advanced organization is the integration of their data, processes, and tools to enable a decision. Within the CAF, although we seek to make decision based on data-centric insights, we currently depend on the manual exchange of information via email and excel spreadsheet. Our data collection and analysis process are unfortunately too slow, and the data is most likely expired by the time we consume it for decision-making. But contrary to the popular belief, you do not need a state-of-the-art infrastructure to start your data analytics journey. The CA simply needs to develop its ability to better collect and leverage its data, generate insight, and scale it. But where do we start?

⁶ Salesforce. "What is Digital Transformation? ", last accessed 23 January 2022, <https://www.salesforce.com/ca/products/platform/what-is-digital-transformation>.

⁷ Gartner. "Digital Transformation", last accessed 23 January 2022, <https://www.gartner.com/en/information-technology/glossary/digital-transformation>

⁸ McKinsey & Company. "Unlocking success in digital transformations", last modified 29 October 2018. <https://www.mckinsey.com/business-functions/people-and-organizational-performance/our-insights/unlocking-success-in-digital-transformations>.

⁹ Keith Rogers and A. Scott, *From Data to Insight: A Concise Guide to Practical Analytics*. (Kingston, 2020)

Areas of opportunity for the CA

7. To kickstart the digital transformation of the Canadian Army, there are few disciplines across the emerging trends that can be implemented under a short time frame, and with limited resources. These areas of opportunities are Business Intelligence (BI) with descriptive analytics, and in-house software development capacity to improve data collection and consumption, and to digitize business processes.

8. The CA needs to develop an ability to do gain insight from its current data by developing its BI and descriptive analytics capability. BI is the ability to make informed business decision based on the analysis of data within the organization¹⁰. Descriptive analytics is the simplest form of data analytics which leverage past data to gain situational awareness of the current states of affairs. It tries to answer the question “what happened or what is the current state” of the data. Analysts leverages visualization and dynamic dashboard to query, manipulate, analyze the data, and gain insights. World-leading analytics platform such as Tableau¹¹ or PowerBI¹² is highly intuitive and requires less than a week of training to achieve a functional level of proficiency. To be successful, business analysts require more organizational knowledge than technical skills. And to our advantage, the military is filled with business analysts. We have experts in logistics, finance, operations, HR, etc. Therefore, we already have a critical mass of talent that is only waiting training to navigate the complex data environment.

9. For every excel spreadsheet that is sent around the organization via email to consolidate information, there is an opportunity for a small web application to be built. Creating an integral software development capacity within the CA would allow to rapidly digitize the collection, processing and provisioning of data generated by the organization. At the tactical level, staff could leverage web application and databases to support battle management processes, making the data more accessible and resilient. Moreover, the emergence of Low-Code platform accelerated the ability for development cells to create and release basic prototypes to its users. Low-Code platform leverages graphical interface to create apps and flows instead of using written programming language, thus needing less technical proficiency to build and institutionalize applications. In 2021, the CANSOFCOM digital transformation program conducted a trial of a Low-Code platform, and the results were game changing. The average time to create an application prototype went from weeks to hours. This technology democratizes application building across the organization.

The Identification of the Business Value.

10. The CA digital transformation should focus on the conduct of operations and ensuring that commander and their staffs can execute their job faster, smarter and with less resources. In the business terminology, the *customer value proposition* is the “the model that helps customers

¹⁰ Alteryx. “What is Business Intelligence?”, last accessed 23 January 2022. <https://www.alteryx.com/glossary/business-intelligence#:~:text=Business%20intelligence%20is%20the%20cumulative,to%20help%20inform%20decision%20makers>.

¹¹ Tableau, last accessed 23 January 2022. <https://www.tableau.com/>

¹² Microsoft. “PowerBI”, <https://docs.microsoft.com/en-us/power-bi/fundamentals/power-bi-overview>

perform a specific job that alternative offerings don't address"¹³. Within digital transformation, a recurring mistake is often to focus too much on a specific technology rather than the actual value we try to create out of this transformation¹⁴. Therefore, it is crucial to first identify what our value proposition will be, and then ensure that the technology, workforce skillset, and resources match our level of ambition to deliver on that proposition.

11. There are three approaches to the type of solution the CA could build:

- (1) *Enterprise-focus approach*. It could focus on modernizing the management of the enterprise such as supply chain, finance, human resources, and other enterprise function. On the other hand, DND is already investing heavily in the implementation of the SAP Enterprise Resources Planning (ERP) systems, and the overall enterprise modernization is most likely going to be driven by a champion outside of the CA. Therefore, this proposition could have limitation on its ability to innovate outside of the departmental framework.
- (2) *Operations-focus approach*. It could aim at improving our efficiency and effectiveness in the conduct of land operations such as intelligence processing, operational decision-making, and battle management. Many of the staff digital procedures leverages Microsoft Office tools, which is suboptimal in a big data environment.
- (3) And (3) third, the CA could focus on both at the same time. This approach is very broad in scope, allows flexibility, but poses a risk of duplication of effort.

12. Independently of the approach taken, the first initiative should be quick to be released and worthy to most of the community. Value must be proven early to incite change across the organization. This value is implemented and managed under the product management discipline.

The Product Management Approach.

13. For the CA to be able to identify problems and release prototype rapidly, it must develop a product management approach from the start. Product management is the discipline that has for function the overseeing of “every step of a product’s life cycle, from development to positioning”¹⁵. It is the intersection of the business or customer needs, the technology, and the user experience¹⁶. Product management is all about understanding the problem requiring to be solved, and understanding the pain points of its customers¹⁷. In the private sector, the main

¹³ Johnson, Mark W., Clayton M. Christensen, and Henning Kagermann. "Reinventing Your Business Model." *Harvard Business Review* 86, no. 12 (2008)

¹⁴ Dennis Carey, Charan.,Lamarre., Smaje. and Zimmel. “The CEO’s Playbook for a Successful Digital Transformation,” *Harvard Business Review*, last modified 20 December 2021. <https://hbr.org/2021/12/the-ceos-playbook-for-a-successful-digital-transformation>

¹⁵ Atlassian Agile Coach. “Product Management: What is Product Management?”, last accessed 22 January 2022. <https://www.atlassian.com/agile/product-management>

¹⁶ *Ibid.*

¹⁷ GitLab. “Product Principles”, last accessed 22 January 2022. <https://about.gitlab.com/handbook/product/product-principles/>

purpose of product management is to ensure user adoption and make revenues. The difference with the military is that value is measured in time economy, effects delivered, or saved costs.

14. Product management is embodied by the product owner. The product owner is the member of the agile team that interact with the customers to identify the objectives, functions and features of a software application or analytical product¹⁸. This person manages the prioritization of the backlog and works closely with the development team in achieving the various features and objectives towards a Minimal Viable Product (MVP). An MVP is defined as “a version of a product with just enough features to be usable by early customers who can then provide feedback for future product development”¹⁹.

15. Within the military context, the product owner should be an individual who has a strong understanding of the organization and the conduct of operations. She should have a high level of creativity, and an affinity with technology. For example, the CANSOFCOM Digital Transformation Initiative (Gradient Ascent) Co-Lead and Product Owner is an Infantry officer with extensive organisational knowledge. His tactical and operational acumen allows for rapid understanding of the user’s need and effective translation of business problems into technical requirements for the developers. His role includes the oversight of quality assurance of the various software applications and promotes the tool across the organization with a goal to increase user adoption. His focus is on the prioritization of value and outcome, and the development team ensure the technology supports the intent for the product.

16. To do their role efficiently, product owner needs proximity to the customers, physically or virtually. One of the key product development principles is that “*You’re not the customer – it is tempting to assume that we understand our customers, but we are often wrong*”²⁰. In other words, even if we think we understand what the commanders and their staff need for information and tools, we may still be wrong about the type of problem they need to solve. Moreover, not every customer has the same perception of a problem from the strategic to the tactical level. Therefore, to create value, it is crucial to enable innovation at the edge. Thus, both CA Divisions and Canadian Mechanized Brigade Group needs the capacity to conduct product development, both in the area of data analytics and application development.

Governance and Edge Innovation.

17. A recurring counterargument to decentralized development is the potential for duplication, lack of control and misalignment with policy. Consequently, the departmental approach was to develop governance framework early in the process to address such risk. However, it is debatable if these governance mechanisms remove flexibility instead of enabling innovation. Processes and policy must be built around people and capabilities. It should support organizational structure when it is imperative to manage the growth and scaling of our product across the enterprise. It should be developed around the type of product we want to support and scale, vice creating an environment where policy dictates the tool an organization should use and limit its ability to experiment and understand its data.

¹⁸ Scaled Agile. “Product Owner”, last accessed 23 January 2022.
<https://www.scaledagileframework.com/product-owner/>

¹⁹ Wikipedia. “Minimum Viable Product”, last accessed 23 January 2022.
https://en.wikipedia.org/wiki/Minimum_viable_product#cite_note-1

²⁰ GitLab. “Product Principles”, last accessed 22 January 2022.

19. Since the CA digital transformation is at its infancy, there must be a better understanding of the end state we are seeking to achieve with our digital transformation. And, to reach that understanding, it will take various iterations of experimentation to ensure that our vision and our “business model” is the right one. As reiterated regularly in the book *Lean Startup*, chasing an initial MVP is paramount to understand our business value proposition²¹. Hence, the only option to conduct that experimentation is to start with a small simple idea. Otherwise, we may go down a path of “*Analysis Paralysis*”, where we keep refining the scope of the problem due to its high level of complexity. We may perceive a sense of progress, but without any tangible output²². Unfortunately, the creation ADM(DIA) mainly led to the development of Data Strategy documents and Data Management policies. However, it lacks the establishment of mechanism to enable L1 to build, fund and resources their own digital transformation capabilities²³. Thus, the responsibility is on the CA to lead the development of its own digital capabilities and establish from the ground up its entrepreneurial journey toward digital transformation. And, it will be upon them to create its own framework to support its scaling ambitions.

CONCLUSION

21. The Canadian Army understands the need to digitally transform to compete within the current and future battlespace. It has a 10-year horizon with the objective to have operationalized a data analytics capability and build a digital workforce by 2030. To achieve these objectives, this service paper proposed that it should invest immediately in the implementation of its integral digital transformation capabilities. This service paper proposed a few areas of opportunity such as the development of descriptive analytics teams, and the stand-up of multiple decentralized software application development cells. However, as the scope is significant, it is crucial for the CA digital program to identify its core value proposition, whether it focuses on the enterprise or its operational functions. To implement value, a product management approach will enable the vision and confirm the value proposition by adjusting iteratively as we get feedback from the customers through the first MVPs. To accelerate innovation at the edge, our product management approach should seek to have operationally experience product owner with direct access to its customers, from CA HQ down to the brigades. However, while we enable development at the edge, we must be careful to not create governance and policy that would impede such development. These documents should focus on processes and structures to enable the scaling of the digital programs, only when required. Finally, the CA digital transformation should focus to demonstrate early success and show rapid return on investment to its leadership.

RECOMMENDATION

22. The CA should invest in the implementation of an initial data analytics and software development cell at the tactical level within one of the CMBG. This initiative could be used as a proof of concept to confirm the feasibility of implementing a decentralized approach to digital transformation. This cell should be part of the CMBG Headquarters and Signals Sqn to maximize the proximity to the brigade leadership and the technical support. This development cell should be

²¹ Ibid, 93.

²² Eric Ries, *The Lean Startup* (New York: Crown Publishing Group, 2011), 90.

²³ Department of National Defence and the Canadian Armed Forces, *Data Strategy* (Ottawa: 2019), p.8

composed of at least 1 x Product Manager, 1 x Software Developer, 1 x Data Engineer and 1 x Data Analyst.

23. The CA executive leadership should conduct an analysis to determine the focus of the digital transformation efforts, and the value proposition to its customers. This executive guidance will drive the prioritization of the program and its underlying products.

24. Talent recruitment and management are crucial to the success of the CA digital program. An active talent identification initiative should be implemented to identify members within the workforce that have the right education, skillset, creativity, and business acumen for such initiative. Identifying “top talent” is key for short-term success.

25. The CA executive leadership and digital transformation team should work in collaboration with ADM(DIA) and ADM(IM) to provide an enterprise-level DevOps environment to enable decentralized team with the data, tooling and infrastructure required to conduct rapid agile development.

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