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KNOWLEDGE AND THE DEFENCE ENTERPRISE: DEVELOPING A CULTURE OF "NEED TO SHARE" FOR ORGANIZATIONAL SUCCESS

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KNOWLEDGE AND THE DEFENCE ENTERPRISE: DEVELOPING A CULTURE OF "NEED TO SHARE" FOR ORGANIZATIONAL SUCCESS

By Major W.E. Gamblin

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ABSTRACT

Knowledge is the energy to create power within an organization, but only if it can be harnessed in an effective and efficient manner. Catalyzed by rapid advancements in technology and fueled by information, today's knowledge culture is shifting from a "need to know" to "need to share" paradigm, which is redefining the nature of human endeavours across complex social groupings. For the military, this shift offers a path to increasing organizational effectiveness across the full spectrum of defence missions, but only if cultural change can be embraced.

Changing organizational culture is reliant on people seeing value in the change and then being guided towards a new reality. Amidst an evolving social environment that is characterized by complexity, an uncertain future security environment, and the emerging information society, knowledge is the determinant of success or failure in organizational endeavours. This knowledge is cultivated within a knowledge space where knowledge management frameworks provide the means of how we do, organizational learning approaches the methods of how we come to know, and knowledge transformation influences the motivations for why we change. To remain effective, organizations must have a vision that recognizes the relationships between knowledge management, organizational learning, and knowledge transformation, while shaping the culture of the organization by promoting awareness, participation, and sharing.

This paper will explore the notion of the Department of National Defence and Canadian Armed Forces being part of a defence knowledge enterprise, while arguing that the organization must adopt a culture of need to share in order to remain relevant in the complex future security environment. Knowledge-related theory, analysis, and a re-conceptualization of defence knowledge enterprise will be presented to describe the environment, identify gaps and opportunities, and offer considerations to affect fundamental organizational change.

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INTRODUCTION

> *The only irreplaceable capital an organization possesses is the knowledge and ability of its people. The productivity of that capital depends on how effectively people share their competence with those who can use it.*
>
> - Andrew Carnegie, U.S. Steel, 1919

When Thomas Hobbes published *Leviathan*[1] he coined the perennial, and seemingly infallible, proverb "scientia potentia est" (literally, "knowledge is power"). However, he was wrong. Over 350 years later, the world is coming to the realization that knowledge is not power; rather, knowledge is the energy to create power. Like energy, knowledge represents a potential benefit to those who use it, but only if it can be harnessed and shared in an effective and efficient manner. As humanity transitions from an industrial to informational society, the question of how to harness knowledge is challenging the very foundations of academia, industry, government, and the media.[2] Catalyzed by technology and fueled by information, today's knowledge culture is experiencing a paradigm shift from "need to know" to "need to share," which is redefining the collaborative nature of human endeavours across complex social groupings as it applies to achieving a knowledge advantage. For the military, this shift offer's a path to increasing organizational effectiveness across the full spectrum of defence missions and tasks, but only if cultural change can be embraced. This paper will argue that the Department of National Defence (DND) / Canadian Armed Forces (CAF), as a defence knowledge enterprise,[3] must adopt an

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[1] Thomas Hobbes, *Leviathan*, ed. C.B. Macpherson (Harmondsworth: Penguin, 1968), Part 1 Chapter X. The idea that "knowledge is power" is attributed to Sir Francis Bacon, but was shared by Hobbes in Leviathan. Hobbes' explicit use of the phrase "scientia potentia est," which is the motto of the Canadian Forces College, made citing Leviathan à propos for this paper.

[2] David Weinberger, *Too Big To Know: Rethinking Knowledge Now That the Facts Aren't the Facts, Experts Are Everywhere, and the Smartest Person In the Room Is the Room* (New York: Basic Books, 2011), x - xii.

[3] *Merriam-Webster Online*, s.v. "Enterprise," http://www.merriam-webster.com/dictionary/enterprise. For this paper the defence knowledge enterprise is comprised of the elements that contribute to defence knowledge.

organizational culture of need to share in order to remain relevant in the complex future security environment (FSE).[4]

Three fundamental research questions will be explored in this paper. First, what knowledge theories are relevant to today's knowledge environment? Second, how do these knowledge theories apply to the contemporary defence knowledge enterprise? Lastly, why must the DND/CAF adopt an organizational culture of need to share? To answer these questions, this paper will be divided into three parts (illustrated at Figure 1). Chapter 1 will present a sampling of knowledge theories and objectives, as well as provide a proposed taxonomy derived from an interdisciplinary literature review spanning sociological, defence, complexity science, and knowledge theorists. Chapter 2 will analyze the defence knowledge enterprise, as it is today, using secondary sources and the author's first hand perspective to identify extant gaps, opportunities, and provide examples related to knowledge sharing in the DND/CAF. Chapter 3 will provide a synthesis of theory and analysis to propose a new set of models that represent the relationship between knowledge management (KM), organizational learning, and knowledge transformation, in the context of today's defence knowledge enterprise, which are all reliant on need to share to be effective. This paper will also provide an author's illustration of how the proposed models could be applied in the DND/CAF.

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[4] Department of National Defence, *The Future Security Environment 2008-2030, Part 1: Current and Emerging Trends* (Ottawa: CFD, 2009).

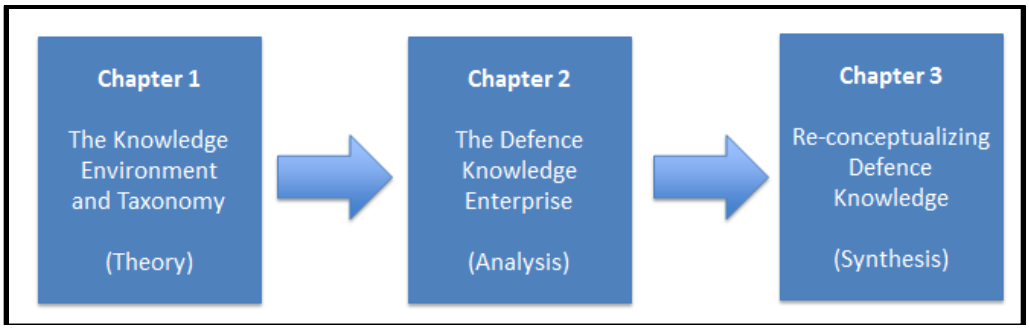

Figure 1 – Directed Research Paper Structure

THEORY

The contemporary knowledge environment provides the context for discussing knowledge and its place in today's defence enterprise. From theory, today's social environment is characterized as a transitional industrial-information society, which is a product of the emergence of the information age. To further frame the environment, Frank Webster provides five criteria for characterizing the information society: technological; economic; occupational; spatial; and cultural.[5] However, for the purpose of providing context to the analysis of the defence knowledge environment, this paper will focus on the technological, occupational, and cultural facets of social change as they are deemed directly relatable to the concepts of KM, organizational learning, and knowledge transformation.

First, technological advancements and rapidly evolving information and communication technologies (ICT) have created pervasive, constant, and omnipresent access to knowledge, which contributes to an environment of *complexity* and the defence enterprise as a *complex adaptive system*. From an appreciation of complexity, and the potential for adopting new mental

[5] Frank Webster, *Theories of the Information Society* (London: Routledge, 2006), 8-21.

models for leadership to solve defence related complex problems,[6] a recognition of the impact of the complex reality will form the basis of an argument for KM as having the most value when applied to the day-to-day operating domain. Second, occupational shifts spurred by organizational influences on the specialties and capabilities required for future defence missions and tasks situate discussion pertaining to learning as an organization. The DND/CAF description of the *FSE*,[7] which provides a basis for force development, demonstrates recognition of the need for the organization to comprehensively appreciate the changing security environment and contributes to an argument for defence enterprise improvement by iteratively and adaptive organizational learning as an institution. Finally, the notion of a unique DND/CAF organizational culture, influenced by the environment that shapes organizational beliefs and values, will provide the basis for discussing motivations and apprehension related to knowledge-centric transformational change. Within the context of an emerging globally connected, locally engaged *information society,*[8] organizational culture will be offered as the predominant influence on defence knowledge transformation.

The concepts of *knowledge*, *learning* and *culture* are central themes in this paper. Sharing elements of *lessons learned* and *best practices*, as well as *communities of practice* (CoP) and *centres of excellence* (CoE), will be offered as enablers of the defence knowledge enterprise. Further, the components of the framework of interrelated knowledge-centric disciplines, inclusive of *KM*, *organizational learning*, and *knowledge transformation*, will be described. Whereas KM and organizational learning are already well represented in the literature, the notion

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[6] Christopher R. Paparone, Ruth A. Anderson, and Reuben R. McDaniel Jr., "Where Military Professionalism Meets Complexity Science," *Armed Forces and Society 34, no. 3* (2008), 433-449.

[7] Department of National Defence, *The Future Security Environment….*

[8] Webster, *Theories of the Information Society*, 8-31.

of knowledge transformation, as an approach to change how an organization's knowledge evolves, is a new proposition that will be put forward by this paper. The description of these concepts will provide a knowledge taxonomy that will be used in this paper when analyzing the defence knowledge enterprise, as well as for the presentation of the proposed re-conceptualization of defence knowledge in the future.

ANALYSIS

An organization's need to manage change is constant, with significant time, effort, and resources being invested in trying to appreciate change by comparing *what is* to *what was*, and then endeavoring to determine *what will be*. Identifying the gaps and opportunities in today's defence knowledge enterprise can be challenging given the complex reality that places organizations at the "edge of order and chaos."[9] From secondary source research, a description of this complex reality will be provided by examining: the U.S. Armed Forces KM framework as compared to the DND/CAF, with a focus on technology in the context of KM and *how we do*; DND/CAF lessons learned about lessons learned, with emphasis on the organizational learning processes by which *we come to know*; and CAF transformation as it relates to knowledge transformation and *how we change*. This analysis will also highlight defence knowledge deductions for consideration when evolving defence knowledge paradigms that must provide value today, while remaining open and adaptable to the demands of the future.

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[9] M. Mitchell Waldrop, *Complexity: The Emerging Science at the Edge of Order and Chaos* (New York: Simon and Shuster, 1992).

SYNTHESIS

In order to interpret an otherwise chaotic knowledge environment, a number of knowledge models will be proposed. By presenting a series of models that link KM, organizational learning, and knowledge transformation, this paper will offer a comprehensive knowledge framework that draws from theory and is influenced by analysis. Inherent in the models are defence knowledge objectives specific to changing the existing paradigm to address gaps and leverage opportunities in the contemporary knowledge environment. Within an operating environment where KM is a mechanism to leverage the organizations knowledge products to better deal with complexity, the goal of making better use of knowledge technology will be discussed. Within the institutional environment where organizational learning develops the knowledge processes that set the conditions for future success, an argument for integrated learning approaches and effects will be presented. Further, defence knowledge transformation, and the influences related to it, will be discussed. These models and objectives are intended to provide perspective and highlight potential value when applied to the broader defence enterprise while, at the same time, supporting the thesis of transitioning from a need to know to a need to share culture.

LIMITATIONS AND BIASES

This research paper focuses on a number of theories, examples, and ideas that relate to defence knowledge and the role sharing within the organization plays in enabling the DND/CAF to use, develop, and transform knowledge. This approach emphasizes breadth over depth in an attempt to provide a more complete overview of the problem space. To this end, this paper should be regarded as a starting-point from which to appreciate the “bigger picture” and to

situate follow-on research in the field of defence knowledge. As an Army Signals Officer with experience in land and joint operations, Army training delivery and development, as well as command and control capability design and delivery, the author possesses a first-hand appreciation of the gaps and opportunities related to defence knowledge. Furthermore, the ideas in this paper are biased and informed by the author's perspective as a member of the CAF who has been professionally engaged in information management (IM) and KM related development for the last 14 years.

CHAPTER 1 – THE KNOWLEDGE ENVIRONMENT

The Knowledge Environment
Source: Generated from Chapter 1 themes using www.wordle.net

INTRODUCTION

Theory provides the lens through which a perception of reality can be formed. The evolving perception of the contemporary knowledge environment can be drawn from a sampling of theories and observations offered by academics who strive to explain the world around them in a manner that makes sense to others. This chapter provides a theoretical explanation of the knowledge environment, based on literature review, in order to describe the context and provide a framework of terminology for the analysis and synthesis in this paper. First, the idea of reality as complexity, with organizations as complex adaptive systems, offers new mental models for organizations to apply when operating amidst seemingly chaotic influences. Next, the DND/CAF description of the FSE, as a mechanism to align institutional processes toward potential opportunities and challenges related to harmonizing Canadian defence knowledge development will be provided. A description of the information society, as a basis of social change that is catalyzed by technology, will be provided as part of the dominant influence on

cultural change within the contemporary knowledge environment. Finally, a knowledge taxonomy that forms "a controlled vocabulary [that] focuses on concepts"[10] will be offered to facilitate a common view of the analysis, objectives, and propositions made in this paper.

COMPLEXITY AND COMPLEX ADAPTIVE SYSTEMS

The reality of the world in which we live is one of complexity and constant change. In the context of organizations, these changes can be wide ranging and influenced by evolving social conditions, rapidly advancing ICTs, security related frictions, and new paradigms that emerge in response to, or for the purpose of, change. Subject to constant change, organizations can become confused or risk entering a state of "change fatigue"[11] from constantly reacting to complex influences, thus creating the potential for organizations to hold onto "old school" notions based on what is familiar in lieu of what is required. Currently, there is an emerging body of research, which is striving to shift the foundation of organizational research from General Systems Theory[12] to one that embraces Complexity Theory,[13] challenging the basis of organizational study and how organizations perceive themselves and their environment. Marguerite Schneider and Mark Somers, of the New Jersey Institute of Technology School of Management, contend that organizations are more accurately described as complex adaptive systems that require different leadership approaches to be effectively managed. From this idea

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[10] Marjorie Hlava, "What is Taxonomy?" *KMWorld,* Editorial (March 7, 2012).

[11] Change fatigue is a colloquialism that describes when the members or an organization grow tired of change, viewing change initiatives as change of change sake. The natural human response to change fatigue is trying to avoid or inhibit change initiatives.

[12] Kenneth E. Boulding, "General Systems Theory: The Skeleton of Science," *Management Science 2*, no. 3 (1956), 197-208.

[13] Marguerite Schneider and Mark Somers, "Organizations as Complex Adaptive Systems: Implications of Complexity Theory for Leadership Research," *The Leadership Quarterly 17*, issue 4 (2006): 353-354.

they summarize three inter-related building blocks[14] from Complexity Theory that can be applied to organizations as complex adaptive systems: (1) *Non-linear dynamics*[15]; (2) *Chaos Theory*[16]; and (3) *Adaptation and evolution.*[17]. Further, Bill Bentley and Grazia Scoppio, academics and writers for the Canadian Forces Leadership Institute, elaborate on the description of organizations and the environment as complex adaptive systems by providing the following system characteristics:

- The system is comprised of large number of interacting elements, both internal and external;
- Interactions are *non-linear*, meaning that minor actions can produce disproportionately major consequences;
- The system is dynamic with the whole being greater or different than the sum of the parts and solutions emerging from circumstances;
- Although *chaotic*, the system can appear ordered and predictable in hindsight, but hindsight does not lead to foresight because conditions change;
- Agents and the system constrain one another through multidirectional/multipurpose influences, hence outcomes cannot be predicted with certainty; and
- Elements of the system constantly *adapt and evolve* with one another and the evolution, with the evolution being irreversible.[18]

If we accept that Complexity Theory better describes the contemporary defence environment, there is an argument to be made that defence organizations that resemble complex

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[14] Ibid, 354-355.

[15] Non-linear dynamics is described as disproportionate reactions of a system to environmental change, otherwise known as the "butterfly effect."

[16] Chaos Theory encompasses chaotic non-random behaviour in a system based on attraction of elements.

[17] Adaptation and evolution unifies the other two characteristics, inferring self-organization of the system in response to non-linear influences and chaotic responses.

[18] Bill Bentley and Grazia Scoppio, *Monograph 2012-02: Leading in Comprehensive Operations* (Kingston: Canadian Defence Academy - Canadian Forces Leadership Institute, 2012), 9.

adaptive systems are inherently better suited to effectively deal with complexity. Christopher Paparone et al[19] contend that "new mental models are challenging the concept of strategic leadership as the Department of Defence [DoD], the U.S. government, and American society struggle to adapt to an increasingly turbulent and interconnected global society."[20] The model proposed by Paparone et al is one of military organizations as complex adaptive systems. From their analysis, Paparone et al provide a set of eight leadership tasks, contrasted against traditional notions inherent to military structures (i.e. simple or complicated hierarchies), that may better align to managing the military as a complex adaptive system (Table 1.1).

Table 1.1 – Key Leadership Tasks for Complex Adaptive Systems

New Notions of Military as a Complex Adaptive System	Traditional Notions of Military as a Simple of Complicated System
• Relationship Building • Loose Coupling • Complicating • Diversifying • Sensemaking • Learning • Improvising • Emergent Thinking	• Role Defining • Standardization • Simplifying • Socializing • Decision-Making • Knowing • Command and Controlling • Planning Based on Estimates

Source: Paparone et al, "Where Military Professionalism Meets Complexity Science," 441.

Leaders within a complex adaptive system promote cognitive changes within the organization that impact the very nature of member interaction, how parameters are established for the conduct of tasks, and how decisions are made to achieve desired results. Leaders must

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[19] Christopher Paparone was an associate professor and is currently the Dean of the College of Professional and Continuing Education at the U.S. Army Logistics University; Ruth Anderson is a professor of nursing at Duke University; and Reuben McDaniel Jr. is the Prothro Regents Chair in Health Care Management in the McCombs School of Business at the University of Texas,

[20] Paparone et al, "Where Military Professionalism Meets Complexity Science...," 433.

shift their focus from role definition to *relationship building*, which involves the establishment of habitual relationships that leverage the full capacity of the available human capital of the organization beyond traditionally assigned roles. Whereas rigorous standardization within organizations provides the semblance of order, *loose coupling* of individuals and communities within a system allows for self-organization of knowledge towards problem identification and solution implementation. Replacing simplifying with *complicating* approaches increases organizational agility by expanding the number of potential options to solve complex problems that do not conform to simple solutions. With multiple influences and possible outcomes, *diversifying* for heterogeneity rather than socializing for homogeneity creates the conditions for multidisciplinary and comprehensive engagement of complex situations. While decision-making is essential to leaders, *sense-making* that is achieved through social interaction and development of common meaning within particular circumstances must inform the decision. Collective *learning* through the development of an organization that values knowledge sharing, in lieu of individual knowing and telling others what to do, should be fostered. Creating the conditions for *improvising* will enable organizational agility through the latitude to exercise initiative in response to unanticipated circumstances that occur outside the bounds of hierarchical command and control. Finally, *emergent thinking* focused on knowing what you know and adapting to changes, allows the organization to adjust to surprises that could not be anticipated by planning based on estimates, or an appreciation of the situation limited by time, space and purpose. [21]

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[21] Ibid, 441-446.

FUTURE SECURITY ENVIRONMENT

The Canadian defence knowledge enterprise requires authoritative guidance to frame the contemporary problem space and establish a start point for unity of perception and purpose towards deliberate development and evolution. To this end, the DND/CAF has situated its own institutional development, inclusive of concepts, organizational changes, equipment procurement, doctrine, and training, within the context of the FSE. [22] The FSE is characterized by an operational environment where the effects of continued social, cultural, and technological change are becoming increasingly globalized by persistent interconnectivity. Hence, the emergence of *globalization,*[23] as a unifying meta-trend, is recognized as a dominant theme in the DND/CAF institutional development. The result of these changes is that today's DND/CAF recognizes that it operates in an unprecedented security environment that is increasingly complex and inherently difficult to appreciate.

As identified in the FSE publication, and expanded on by Bentley and Scoppio,[24] the current DND/CAF adoption of the comprehensive approach is a response to "meeting the challenges of the complexity of the future security environment [that] will require contributions from all instruments of national power."[25] Established in CAF joint doctrine, the comprehensive approach is defined as:

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[22] Department of National Defence, *The Future Security Environment.*...

[23] Ibid, 10-11. The FSE document defines globalization as "a process of increased connectivity and interdependence transcending social, economic, and political spheres," with contention that it is not a new phenomenon, but it has reached an unprecedented speed and scope of effect.

[24] Bentley and Scoppio, *Leading in Comprehensive Operations,* 2-6.

[25] Department of National Defence, *The Future Security Environment.*.., 9.

> [A] philosophy according to which military and non-military actors collaborate to enhance the likelihood of favourable and enduring outcomes within a particular situation. The actors may include joint or multinational military forces, Canadian government department and agencies (whole of government), international organizations (e.g. NATO and UN), non-governmental organizations (e.g. CARE, OXFAM, private sector entities or individuals).[26]

Inherent to the comprehensive approach is the need to have an effective Whole of Government (WoG) construct "that incorporates diplomatic [, informational], military, and economic instruments of national power as required."[27] Although the WoG construct offers immense opportunity to achieve operational success within the context of the FSE, it is often challenged by the inability or reluctance to share information and knowledge for mutual benefit across the myriad of entities involved technically, procedurally, and culturally.[28] These challenges in sharing, both internally and externally, appear to be endemic of an organization struggling with complexity and lacking a definitive description of its reality from which to anticipate, plan, and execute tasks in the FSE.

INFORMATION SOCIETY

The 21st century has brought with it an extraordinary period of social change, catalyzed by innovation and advancements in technology that have significant social and cultural implications, as the world transitions from a predominantly industrial to information-based society. Futurists, such as Alvin Toffler, anticipated the transition to an information focused "super-industrial" society with foreboding, warning of the potential negative effects of an increasingly *accelerated* rate of social change that, if left unchecked, would result in a mass

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[26] Department of National Defence, *Canadian Forces Joint Publication 3.0 Operations* (Ottawa: Joint Doctrine Branch, Canadian Forces Experimentation Centre, 2011), GL-3.

[27] Ibid, GL-7.

[28] This notion will be expanded on in Chapter 2.

psychological perception of *transience* that risks leaving people feeling disoriented, confused, incapable of adapting, and generally "future shocked."[29] As part of this transition, Toffler envisioned an exponential increase in the rate of knowledge production, which would need to be managed for it to be constructive, as the fuel for social change. Toffler theorized that the increase in knowledge production would lead to a contemporary redefinition of the idea of knowledge being *power* to one of knowledge being *change*, with accelerated knowledge acquisition or sharing fueling advancements in technology and accelerating change.[30]

Sociologist Daniel Bell expanded on Toffler's notions of social change, albeit with a less dystopian view, categorizing the broad types of societies that make-up today's world as predominantly pre-industrial, industrial, or post-industrial. Bell posited that each society has its own distinct characteristics based on where it focuses the bulk of its human capital, specifically: *pre-industrial societies* are agrarian in nature with the majority of people engaged in the production of food; *industrial societies* focus on the manufacturing of goods and are better positioned to exploit pre-industrial societies; and *post-industrial societies* are information-led/service-oriented with a focus on the knowledge, innovation and science-based industries, giving them an edge in exploiting pre-industrial and industrial societies.[31] Bell's characterizations are significant when analyzing societal and organizational shifts as a result of social change. Specifically, the impact on the role of knowledge as emphasis shifts from the practical to theoretical, which changes how people learn from focusing on experiential to post-

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[29] Alvin Toffler, *Future Shock* (New York: Random House, 1970).
[30] Ibid, 31.
[31] Daniel Bell, *The Coming of Post-Industrial Society: A Venture in Social Forecasting* (New York: Basic Books, 1976). It was interesting to note that Bell's description of the societies were later adopted by Toffler in *The Third Wave* (New York: Morrow, 1980), where Toffler described the transition of one society to the next as "waves" where each new society would push aside the older societies and cultures.

secondary education and effects culture as social norms are being redefined from "blue-collar" to more technical or professional occupations. Bell also provides an explicit definition of knowledge, as "a set of organized statements of facts or ideas, presenting a reasoned judgment or an experimental result, which is transmitted to others [shared] through some communication medium in a systemic form."[32]

Management consultant, educator, and seminal author Peter Drucker's contributions to defining knowledge-based social change inherent to the emergence of the information society are significant. Like Bell, Drucker espouses many of the same themes and ideas regarding the centrality of knowledge and the evolution of learning (learning to learn), but goes into more detail when describing organizations within an information society. The notions of increased decentralization for rapid decision-making, management's responsibility to make everyone a contributor, and the organizations constant competition for the right people are prevalent throughout his writings.[33] Of particular interest is Drucker's declaration that an organization's culture, although influenced by external pressures and trends, must transcend the community or society within which the organization belongs.[34] This idea is based on the belief that organizations are managed towards specific effect, whereas society and its component parts (e.g., communities, families) are not, thus an organization's culture should be deliberately designed to meet organizational needs. Additionally, on the topic of organizational and occupational change or "creating the new," Drucker offers three insightful practices he argues need to be built into the very fabric of the organization: (1) Continuing improvement in everything the organization does

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[32] Ibid, 175.
[33] Peter F. Drucker, *Post-Capitalist Society* (New York: Harper Business, 1993).
[34] Ibid, 61.

(learning as an organization); (2) Learning to exploit (developing new applications of past successes); and (3) Learning how to innovate (innovation as an organized systemic process).[35]

More recently, sociologist Manuel Castells has made major contributions to the study of contemporary society and social change, specifically within his seminal trilogy *The Information Age: Economy, Society and Culture.*[36] In his works, Castells contends that the development of networks enabled by advances in ICTs has ushered in an age where information flows are given priority.[37] Further, Castells does not support labeling our current social state as an information society or knowledge society based on the premise that all societies have used information and knowledge, hence these terms offer little in identifying the distinctness of the present era.[38] Instead, he argues that we are transitioning into a "network society" where:

> The shift from traditional mass media [vertical communication networks] to a system of horizontal communication networks organized around the Internet and wireless communication has introduced a multiplicity of communication patterns at the source of a fundamental cultural transformation, as virtuality becomes an essential dimension of our reality.[39]

Central to Castells views is the idea of the "*space of flows*," global information networks used for real-time coordination, and the concept of "*informationalism*," as a technological paradigm of augmenting human capacity for cognitive processing with ICTs, which identifies

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[35] Ibid, 59-60.

[36] Manuel Castells' *Information Age: Economy, Society and Culture* is a trilogy of books comprised of: *The Rise of the Network Society* (1996), *The Power of Identity* (1997), and *End of Millennium* (1998). Although the complete compendium of work provide a holistic overview of what Castells calls the network society, *The Rise of the Network Society* was the focus of this literature review because it lays the foundations for the "information age" in terms of a confluence of major social, technological, economic, and cultural transformations.

[37] Manuel Castells, "Toward a Sociology of the Network Society," *Contemporary Sociology 29*, no. 5 (September 2000), 693. Information flows refer to the movement of information throughout society and its component parts.

[38] Manuel Castells, *The Rise of the Network Society,* 2nd ed. (Chichester: Wiley-Blackwell, 2010), 21.

[39] Ibid, xviii.

"the action of knowledge upon knowledge itself as the main source of productivity."[40] Inherent to these notions is Castells' belief that the Internet possesses "technologically and culturally embedded properties of interactivity and individualization,"[41] and that "the Internet will expand as an electronic agora,"[42] which will result in a more "interactive society."[43] Certainly, in a world where information and communication exchanges are constant, mobile "smart" devices are pervasive, and social networking sites attract mass interactive audiences, it is difficult to dispute Castells' view of the dominance of the technological influence on knowledge, business processes, and culture. However, whereas Castells maintains an overall optimistic view of the impact of technology on society, the increased complexity from greater awareness, more connections, and an almost chaotic proliferation of information must not be discounted as society and organizations adapt, evolve, and position themselves for the future.[44]

Sociologist Frank Webster critically examined the proposition that we have, or are undergoing, a socio-cultural change that merits recognition of the information society. Although he offers criteria for measuring social shift to an information society, he identifies the difficulty in having "confidence in a concept [the information society] when its adherents diagnose it in quite different ways."[45] He contends that *information* is the quantifiable unit of measure to be used in the analysis of the information society (i.e., from a technological, economic, or spatial perspective),[46] but he also recognizes *theoretical knowledge* as an alternative qualitative measure

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[40] Ibid, 11 and 17.
[41] Ibid, 358. Although Castells is referring to the Internet specifically, the author contends that the same human-technology integration characteristic applies to intranets used by organizations or communities.
[42] Ibid, 357.
[43] Ibid, 358.
[44] Ibid, xxiv-xxxi.
[45] Webster, *Theories of the Information Society*, 31.
[46] Ibid, 25-28.

of information-driven social change (i.e., from an occupational and cultural perspective).[47] The relevance of Webster's critique is that the scientific preference to describe the social transition in a quantifiable manner can be limited given the scope and magnitude of the qualitative impacts, thus contemporary social change cannot be measured in terms of quantity without first considering quality or content. Hence, organizations require their own determination of what constitutes *value* in order to determine the significance of what they perceive as relevant to their business in a changing world.

The influence of the emerging body of theory related to the information society is reflected in new organizational paradigms. David Alberts and Richard Hayes, researchers with the U.S. DoD Command and Control Research Program, have pursued re-conceptualizing management and the military command and control (C2) function in the context of a more networked organization, enabled by technology and reliant on the cognitive agility of the people using the technology. From their analysis of networked command constructs, Alberts and Hayes contend that organizations should be viewed as networks whose people or "nodes" are empowered by "expanding access to information [knowledge] and the elimination of unnecessary constraints."[48] What they describe is an evolution from a tightly-constrained centralized hierarchy to a decentralized information-rich "edge organization,"[49] where information and knowledge move freely, but with purpose, within a dynamic and adaptive organization. Similar to the information society, this evolution may be catalyzed by rapid

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[47] Ibid, 28-31.

[48] David S. Alberts and Richard E. Hayes, *Power to the Edge: Command and Control in the Information Age* (Washington D.C.: CCRP Publication Series, 2003), 5.

[49] Ibid.

advances in technology, but remains dependent on the adoption of cultural paradigms that prioritize organizational knowledge over individual knowing to achieve goals.

KNOWLEDGE TAXONOMY

Knowledge

Creating a common perception of knowledge is essential to analyzing, discussing, and making propositions concerning its value, use, and importance within an organization. The current DND/CAF definition of *knowledge* is "analyzed information that provides meaning and value."[50] Further, The CAF recognizes three general categories of knowledge as *core*, *supporting*, and *specialized* that are applied across the tactical, operational, strategic and policy levels or sub-systems.[51] In comparison, the Government of Canada (GoC) ascribes to defining knowledge in terms of *deep*, which is "knowledge of basic theories, first principles, axioms, and facts about a domain" and *surface*, which is "knowledge that is acquired from experience and used to solve practical problems."[52] For the purposes of this paper, Gavin Bennett's and Nasreen Jessani's[53] KM strategy model will be used to represent knowledge (see Figure 1.1). In this model, knowledge is illustrated as an interaction between three elements: (1) People and what they know; (2) Processes as the steps that describe how people or systems come to know; and (3) Products that represent knowledge.[54]

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[50] Defence Terminology Bank, s.v. "Knowledge," http://terminology mil.ca/term-eng.asp (Defence intranet).

[51] Department of National Defence. A-PA-005-000/AP-001. *Duty with Honour: The Profession of Arms in Canada* (Kingston: Canadian Defence Academy - Canadian Forces Leadership Institute, 2009), 52-53.

[52] Termium Plus, s.v. "Knowledge," http://www.btb.termiumplus.gc.ca

[53] Gavin Bennett is a journalist, author, and strategic communication consultant; Nasreen Jessani is a member of the Knowledge Translation and Policy Task Force of the World Health Organization.

[54] Gavin Bennet and Nasreen Jessani, *The Knowledge Translation Toolkit: Bridging the Know-Do Gap, a Resource for Researchers* (Ottawa: International Development Research Centre, 2011), 11.

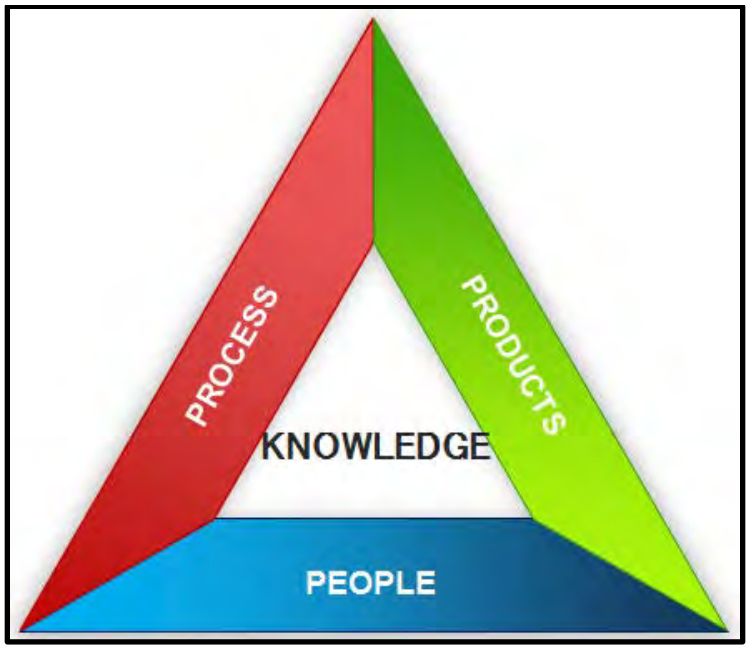

Figure 1.1 – Adapted Knowledge Model
Source: Bennett and Jessani, *The Knowledge Translation Toolkit…*, 11.

When looking outside the DND/CAF, the term knowledge does not appear in literature to be universally defined or consistently applied amongst academics, theorists, policy writers, or practitioners of knowledge disciplines. In fact, most of the literature pertaining to knowledge either avoids defining knowledge, or uses it as a term that is assumed to be understood. This ambiguity inevitably leads to confusion or non-specific interpretation when discussing, developing, or applying knowledge related theories, practices, or outcomes. From a more philosophical perspective, knowledge can be defined as "*justified true* [verifiable] *belief*"[55] within a specific *context* for the purpose of affecting, or increasing the capacity for, effective *action*.[56] This definition complements the DND/CAF definition and should appeal to organizations as it emphasizes the notions of human interaction (i.e., knowledge comes from

[55] Ikujiro Nonaka, "A Dynamic Theory of Organizational Knowledge Creation," *Organizational Science 5*, no. 1 (1994), 15.
[56] Ikujiro Nonaka, and Hirotaka Takeuchi, *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation* (New York: Oxford University Press, 1995), 58-59.

people), the importance of context (i.e., knowledge is only relevant when situated in time, space, and/or purpose), and is purposeful as an enabler of action (i.e., knowledge applied by the individual or organization, knowledge shared improve understanding). Further, complementary to the GoC recognized deep and surface knowledge, polymath Michael Polanyi[57] introduced the idea of *tacit* what people know and *explicit* what can be expressed or codified in processes and products knowledge that is expanded on by organizational knowledge researchers Ikujiro Nonaka and Hirotka Takeuchi in their analysis of knowledge conversion (Figure 1.2).[58]

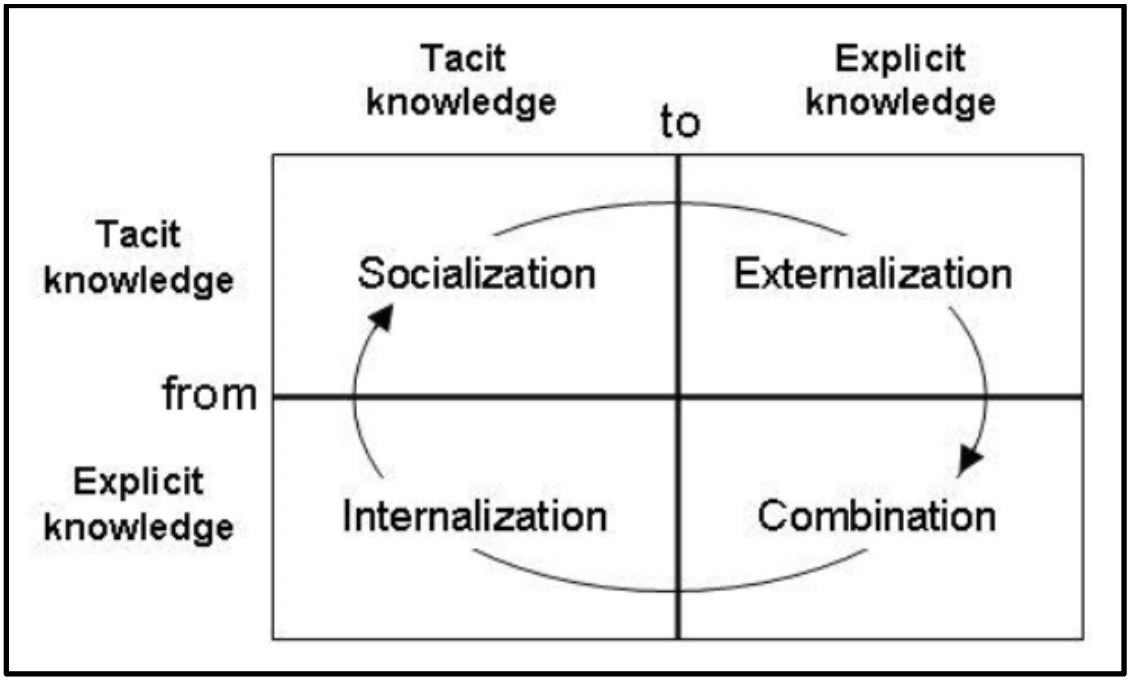

Figure 1.2 – Four Modes of Knowledge Conversion
Source: Nonaka and Takeuchi, *The Knowledge Creating Company…*, 62.

As presented by Nonaka and Takeuchi,[59] tacit and explicit knowledge are created through procedural interactions that are captured under four modes of knowledge conversion: (1) Socialization; (2) Externalization; (3) Combination; and (4) Internalization. *Socialization* is the

[57] Michael Polanyi, *The Tacit Dimension* (London: Routledge & Kegan Paul, 1967).
[58] Nonaka, *The Knowledge-Creating Company*…, 59.
[59] Ibid, 62-70.

conversion of tacit knowledge to tacit knowledge through social interaction. Given that tacit knowledge is knowledge that resides within people that is often difficult to express, tacit-to-tacit socialization seeks to pass on knowledge through sharing experiences (i.e., story telling) or demonstration (i.e., replicating the experiences). *Externalization* is the conversion of tacit knowledge to explicit knowledge by articulating what is known by the person or group in some sort of tangible product (e.g., written word, metaphor, concept, or model). This process can be challenging, as the knowledge product needs to encompass tacit facets that may be difficult to express; hence, Nonaka and Takeuchi propose the "sequential use of metaphor, analogy, and model"[60] as the key to articulating a relatable tacit idea or belief in a manner that can be explicitly represented (e.g., after action reviews or lessons learned). *Combination* is the conversion of explicit knowledge to explicit knowledge by combining different bodies of codified knowledge to create new variations, usually as part of a knowledge system. This process is common in learning institutions where students review sources of explicit knowledge and then combine the knowledge in novel ways to produce new knowledge. *Internalization* is the conversion of explicit knowledge to tacit knowledge, which is related to "learning by doing."[61] Unlike socialization, which involves "reliving the same experience," internalization involves appreciating an experience and having the user derive their own meaning within the context of their own experiences. Whereas externalization and internalization are means for an organization to capture knowledge as an explicit product, socialization and internalization are the mechanisms to pass on knowledge for tacit use by the members of the organization.

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[60] Ibid, 66.
[61] Ibid, 69.

Finally, knowledge is explained contextually by using the cognitive hierarchy, attributed to organizational theorist Russell Ackoff[62] and adopted by the DND/CAF for theorizing, policy making, doctrine development, and learning. This hierarchy is represented by a pyramid comprised of inter-related facets of data, information, knowledge, and wisdom or understanding (illustrated in Figure 1.3). The cognitive hierarchy pyramid espouses the idea of increasing *value* in terms of *usability* as one progresses from data to understanding, with knowledge being reliant on human perception achieved through the use of knowledge-related processes and products.

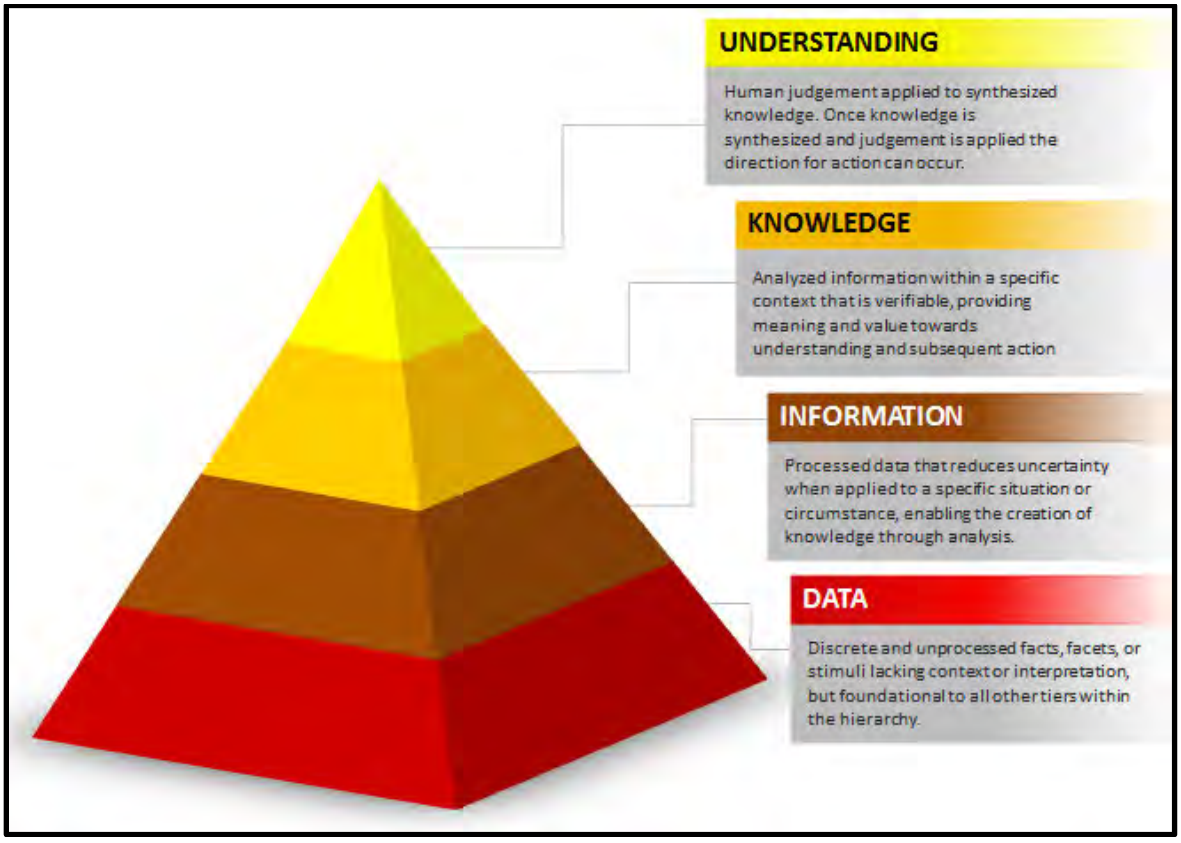

Figure 1.3 – Adapted Cognitive Hierarchy Pyramid
Source: B-GL-331-001/FP-001 *Command Support in Land Operations*, 4-1.

[62] R.L. Ackoff, "From Data to Wisdom," *Journal of Applied Systems Analysis Vol 16* (1989), 3-9.

Learning

Learning is an activity that enables the creation and sharing of knowledge. The DND/CAF adopted definition of learning is "the process by which a biological or automatic system gains knowledge or skills that it may use to improve its performance,"[63] or how we come to know what we need to know to be effective in completing tasks. This learning can occur individually or collectively, but is most commonly the result of some form of social exchange, whether directly (e.g., person to person) or indirectly (e.g., media-based knowledge representation or through experience). This definition is expanded on by the *Canadian Forces Professional Development System* (CFPDS), described in the *Canadian Forces Individual Training and Education System* (CFITES) doctrine,[64] illustrated at Figure 1.4.

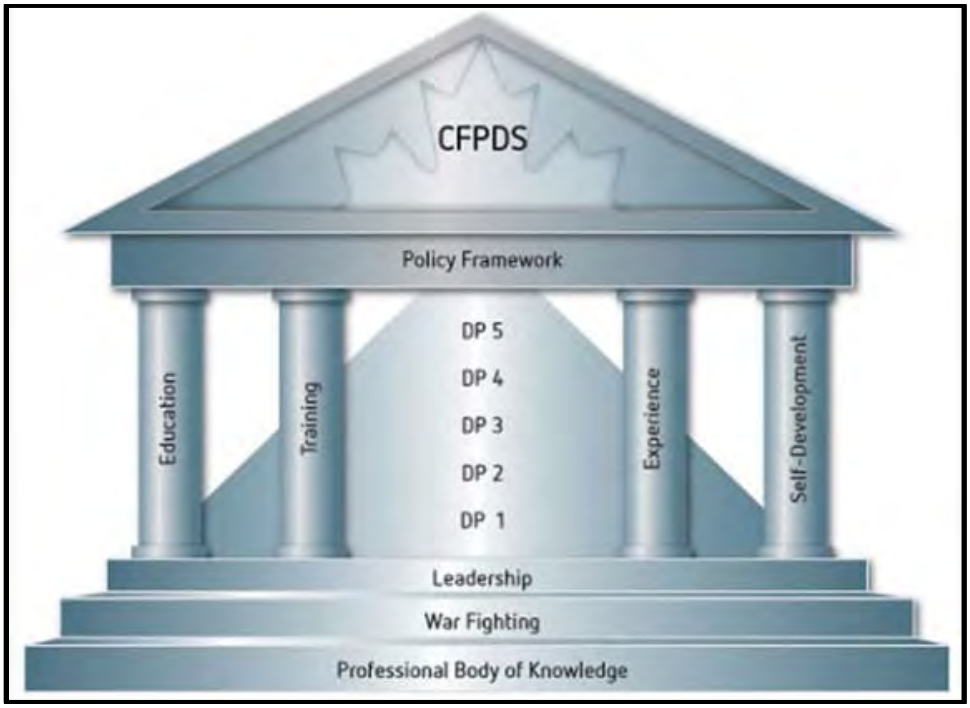

Figure 1.4 – Canadian Forces Professional Development System
Source: National Defence, "Professional Development," last accessed 27 March 2014, http://www forces.gc.ca/en/training-prof-dev/index.page

[63] Defence Terminology Bank, s.v. "Learning," http://terminology mil.ca/term-eng.asp (Defence intranet).
[64] Department of National Defence, A-P9-050-000/PT-001, *Manual of Individual Training and Education Volume 1* (Kingston: Canadian Defence Academy, 2009), 5-6.

The CFPDS represents a holistic and multifaceted approach to individual learning that provides a "comprehensive, integrated and sequential development process that constitutes a continuous learning environment comprised of four pillars [of education, training, experience, and self-development]."[65] The continuous learning notion is persistent, as people are always learning formally or informally from others, their environment, and their own reflection on how they perceive the world around them. The pillars are built on the foundation of core, supporting, and specialized elements of the professional body of knowledge, fundamental war fighting skills, and military leadership, all of which contribute to leading the institution towards the achievement of defence related objectives. The expected outcome of each approach to learning within the CFPDS is:

- *Education* allows for a reasoned response to an unpredictable situation based on knowledge and intellectual skills that allow information to be correctly interpreted and sound judgement exercised. Our cognitive ability to reason, acquired through academic education and practice, enables us to think through a problem and formulate a reasonable solution.

- *Training* is a learned response to a predictable situation based on skills and knowledge to perform specific duties and tasks.

- *Employment Experience* is built on training and education that must be reinforced by the practical application of acquired skill and knowledge through hands-on experience.

- *Self-Development* may take the form of education, training or experience; however, it differs from conventional learning in that it is based on the self-motivation to learn. Self-development is taking personal responsibility for one's own learning and development through a process of assessment, reflection, and taking action.[66]

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[65] Ibid, 5.

[66] National Defence and the Canadian Armed Forces, "Professional Development," last accessed 27 March 2014 http://www.forces.gc.ca/en/training-prof-dev/index.page

Organizational Culture

Bentley and Scoppio contend that "in order to understand organizational culture, we need to first define and understand culture."[67] A pervasive influence on every aspect of human life, culture manifests in a variety of forms and serves a myriad of functions, most notably being a motivation to adopt or resist change. At best, general approximations can be made to describe culture, but these should serve as a start point to determining the true nature of the cultural influences present in a situation. Much of what comprises an individual's adopted culture is difficult to identify as it may not be overtly represented in day-to-day interactions.[68] Hence, the DND/CAF ascribed definition of culture is as follows:

> A shared and relatively stable pattern of behaviours, values, and assumptions that a group has learned over time as an effective means of maintaining internal social stability and adapting to its environment and that are transmitted to new members as the correct ways to perceive, think and act in relation to these issues.[69]

From the DND/CAF definition, it is suggested that culture is embedded in the fabric of the group, passed on by social exchange, and shaped by the desire to survive and prosper in a given environment. When placed in an organizational context, where culture is formed internally while constantly being influenced by the external, a more bounded description of culture is required. Cultural theorist Edgar Schein defines organizational culture as:

> [A] pattern of shared basic assumptions that was learned by a group as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems.[70]

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[67] Bentley and Scoppio, *Leading in Comprehensive Operations,* 27.
[68] Ibid, 28.
[69] Defence Terminology Bank, s.v. "Culture," http://terminology mil.ca/term-eng.asp (Defence intranet).
[70] Edgar H. Schein, *Organizational Culture and Leadership, 3rd Edition* (San Francisco, CA: Jossey-Bass, 2004), 17.

In essence, Schein contends that organizational culture is shaped by purpose (e.g., solving problems) or precedence (i.e., what works) and then passed on as an organizational norm or belief. Schein categorizes organizational culture using three levels: (1) Artifacts represented by visible organizational structures and processes; (2) Espoused beliefs and values inclusive of strategic goals and philosophies; and (3) Underlying assumptions such as unconscious beliefs, perceptions, thoughts, and feelings.[71] In the context of the DND/CAF organizational culture, Bentley and Scoppio elaborate on Schein's organizational culture construct:

- *Artifacts*. Visible products, such as the physical environment, language, technology, products, dress, manners, published lists of values, ceremonies, visible behaviours and processes. Examples include: units, bases, equipment, uniforms, and the attributes/values of the profession of arms.

- *Espoused Values*. A person's sense of what ought to be, ways to solve a problem, what is right and wrong, and what will work or not work. Example would be corrective training in response to an error or failure on a mission where, if successful in solving the issue, could be widely endorsed and serve to make the emphasis on increased training a shared value.

- *Basic Underlying Assumptions*. Beliefs that are taken for granted by a group [such as] implicit assumptions that guide the behavior, perceptions and feelings of the…organization. Basic assumptions are neither confronted nor debated and thus are resistant to change. From the example above, the underlying assumption is that the outcome of increased training will be an improvement in operational effectiveness.[72]

Bentley and Scoppio's elaboration provide the ingredients that make-up defence organizational culture, in terms of what is visible within the organization, the ideals that individuals use to interpret their environment, and the assumptions that the organization views as fact. These levels of culture form the basis of the organizations cultural identity that needs to be appreciated and

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[71] Ibid, 26.
[72] Bentley and Scoppio, *Leading in Comprehensive Operations*, 29-30.

included in any initiative that aims to fundamentally change the organizations perception and influence on reality.

Lessons Learned and Best Practices

Lessons learned is a process that seeks to capture the experiences of the organization for use in building common perceptions of past occurrences to enable improvements in future decision making. The DND/CAF definition of lessons learned is "adding of value to an existing body of knowledge, or seeking to correct deficiencies in areas of concepts, policy, doctrine, training, equipment or organizations, by providing feedback for follow-on action."[73] The DND/CAF policy on lessons learned is articulated under Defence Administrative Order and Direction (DAOD) 8010-0 *Lessons Learned*[74] and DAOD 8010-1 *Operational Lessons Learned Process*,[75] which highlight the importance of capturing and applying lessons learned as part of effective DND/CAF governance and continuous improvement. From policy, the lessons learned process consists of five steps: (1) observe; (2) collect; (3) analyze; (4) direct; and (5) change, with a lesson not considered "learned" until change has occurred.[76] Further, the policy is meant to situate the lessons learned process as a complementary activity to command and leadership, stressing that lessons learned policy "is designed to inform, not usurp, the chain of command and is intended to provide a tool…[that] leadership can use to enable their organizations to both learn from mistakes, as well as improve on the basis of best practices."[77]

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[73] Defence Terminology Bank, s.v. "Lessons Learned," http://terminology.mil.ca/term-eng.asp (Defence intranet)

[74] Department of National Defence, DAOD 8010-0 *Lessons Learned*.

[75] Department of National Defence, DAOD 8010-1 *Operational Lessons Learned Process*.

[76] Ibid.

[77] Andrew B. Godefroy, "Lessons Learned About Lessons Learned," *Consultant's Report* for Lessons Learned Division (Directorate of Learning and Innovation, Canadian Defence Academy, 2009), 12.

Best practices are defined by the DND/CAF as, "an effective method that is promoted to effect change and ensure its continued use."[78] Best practices can be a formal output of the lessons learned process, but can also be identified and adopted less formally. Sharing what works is a common occurrence amongst individuals, especially in organizations where senior members will impart experience on junior members within the bounds of the hierarchy (i.e., supervisor-subordinate relations) or through mentorship (i.e., seasoned-inexperienced relations). However, the ability to capture best practices formally and make them a part of the organizations body of knowledge requires authoritative institutional processes that seek out the relevant experience of people and codifies it in some sort of tangible, understandable, and accessible format.

Communities of Practice and Centres of Excellence

With the creation and sharing of knowledge situated as a social endeavour, groups that form around particular bodies of knowledge have a prominent role in the curatorship of that knowledge. One such knowledge group is a community of practice (CoP), which social learning author Etienne Wenger and international learning researcher Beverly Wenger-Trayner define as, "groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly."[79] CoPs are commonly seen as self-regulating groups that transcend organizational boundaries to bring together members with an interest or role in sharing and/or advancing a common discipline or expertise. In distinguishing what is and what is not a CoP, Wenger and Trayner identify three crucial characteristics:

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[78] Defence Terminology Bank, s.v. "Best Practice," http://terminology.mil.ca/term-eng.asp (Defence intranet)

[79] Wenger and Trayner, "Intro to Communities of Practice." Last accessed 14 January 2014, http://wenger-trayner.com/theory/

- *The Domain*. CoPs have a shared domain or interest, with the membership committed to the domain, and a distinguishing competence that is shared by the members. The collective competence is valued and the constituents learn from each other.

- *The Community*. CoPs engage in joint activities and discussions to help each other and share information or knowledge. They learn from each other through the relationships they build within the CoP, which are not built on shared tools or common job descriptions alone, but through the interactions that contribute to shared meaning.

- *The Practice*. CoPs go beyond interests: they are practitioners of the discipline who develop a shared repertoire of resources (e.g. tools, processes, and experiences). This repertoire is built over time and can be conscious (i.e. by deliberate design) or unconscious (i.e. manifestation of circumstances). [80]

Wenger and William Snyder identified a number of ways that CoPs can add value to an organization. They help drive strategy by exercising stewardship over a particular body of knowledge and providing an informed perspective to the organization through the constituents within the organization. They start new lines of business (i.e., identify new capabilities) that contribute to the organization's ability to accomplish its mission. They solve problems quickly by having access to a network or experts who can contribute to problem definition and "solutioneering" beyond the inherent capacity of the individual or organization. They transfer best practices that, when shared, improve the overall competence of the CoP and the organizations they are a part of. They develop professional skills that contribute to the credibility of the CoP and the effectiveness of the organization. Finally, they help recruit talent by being cognizant of an organization's needs and aware of whom within their specific CoP may

[80] Ibid.

be suited to fill that need. [81] A "snapshot comparison" of CoPs, and other types of knowledge generating or sharing groups is provided at Table 1.2.

Table 1.2 – Adapted "Snapshot" Comparison of Communities of Practice

	Purpose	Members	Binding Influence	Duration
Community of Practice	To develop the members' capabilities to build and exchange knowledge	Members who select themselves	Passion, commitment, and identification with the groups "expertise"	As long as there is interest by the group in maintaining the group
Formal Work Group	To deliver a product or service	Everyone who reports to the groups manager	Job requirements and organizational goals	Until reorganized or disbanded
Project Team	To accomplish a specific Task	Employees assigned by senior management	Project milestones and deliverables	Until the project has been completed/closed out
Informal Network	To collect and pass on business information	Friends and business acquaintances	Mutual needs	As long as people have a reason to connect

Source: Wenger and Snyder, "Communities of Practice: The Organizational Frontier," 142.

Centre of Excellence (CoE) is a common, yet inconsistently, used term in the DND/CAF. The Canadian Army doctrine describes the role of a CoE as, "provid[ing] a repository of knowledge and an aggregation of subject matter expertise and authority into the development of related force capability development, doctrine, training and lessons learned."[82] CoEs are expected to participate in all aspects of force management of their particular area of assigned "expertise," spanning force development (i.e., research and development, concept development, capability trials and evaluations, and capability integration/deployment), doctrine development (i.e., doctrine review, technical interpretation, and development and maintenance of supporting publications), training (i.e., advising on standards, developing and maintaining instructional and

[81] Etienne C. Wenger and William Snyder, "Communities of Practice: The Organizational Frontier," *Harvard Business Review 78*, no. 1 (January-February 2000), 140-141.

[82] Department of National Defence, B-GL-300-008/FP-001, *Training for Land Operations* (Kingston: Director of Army Doctrine, 2010), 3-24.

educational materials, providing centralized or decentralized training support), and supporting lessons learned identification, collection, analysis, and change implementation.[83] Whereas the formation of a CoP is usually informal, within the DND/CAF the designation of a CoE is both formally directed and assigned to a formal authority (e.g., commander or senior staff). Despite the differences, CoPs and CoEs can have a mutually supporting relationship. For example, CoPs can benefit from the formal support of a CoE in ensuring the expertise of the domain, community, and practice are institutionalized, while CoEs gain capacity, perspective, and credibility among experts by using and cultivating healthy CoPs.

Knowledge Management

With reliance on an increasingly abundant amount of knowledge, organizations can and should be focused on KM. KM allows the organization to harness the knowledge resident within, and external to, the organization and ensure that the right knowledge is available at the right time in the right place to achieve the desired effect. The DND/CAF defines KM as:

> An integrated systematic approach which when applied to an organization enables the optimal use of timely, accurate and relevant information; it also facilitates knowledge discovery and innovation, fosters the development of a learning organization and enhances understanding by integrating all sources of information, as well as individual and collective knowledge and experience.[84]

Despite the existence of an official DND/CAF definition of KM, John Girard identified that "[a]n agreed definition of knowledge management has eluded scholars and practitioners alike since the term first entered our lexicon [with] [v]irtually every paper penned on the subject

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[83] Ibid, 3-24 – 3-25.

[84] Defence Terminology Bank, s.v. "Knowledge Management," http://terminology.mil.ca/term-eng.asp (Defence intranet).

includ[ing] a re-worked definition."[85] Girard proposes an alternative to the DND/CAF definition as "knowledge management is the creation and sharing of knowledge within Defence."[86] Further, Girard recognized KM as a set of activities, which he illustrated as what he referred to as the *Inukshuk Defence KM Model* (Figure 1.5).

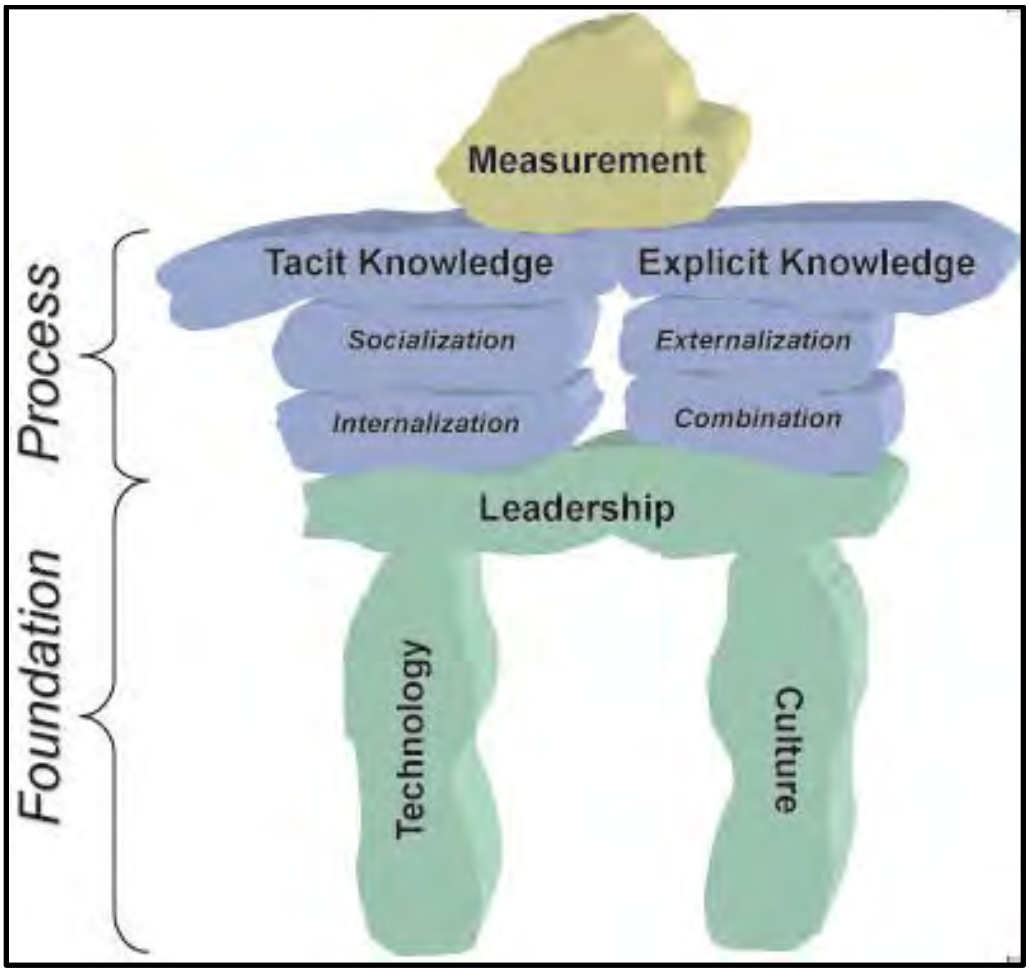

Figure 1.5 – Inukshuk: Defence Knowledge Management Model
Source: Girard, "Defence Knowledge Management…," 21.

[85] John Girard, "Defence Knowledge Management: A Passing Fad?" *Canadian Military Journal* 5, no. 2 (Summer 2004), 18.
[86] Ibid.

Girard's model provides a visualization of the key elements of an organizational KM framework.[87] At the base of the framework are the technologies represented by the technological tools and the culture that determines the motivation to adopt the tools, processes, and fundamental values to manage knowledge. Sitting atop technology and culture is leadership that embodies the attitudes expressed or conveyed by those within the organization who hold personal or positional power.[88] Leadership by its very nature will influence how the organization perceives and adopts technology or changes culture, thus leaders are key determinants in whether a KM (or any) change initiative is successful. On the foundation of technology, culture, and leadership rest the processes associated with tacit and explicit knowledge conversion. These processes and the effectiveness with which they are applied will determine the value gained by the organization from managing its knowledge. Finally, the measurement of how well the organization has defined and achieved its knowledge objectives provides feedback for commanders, staff, and subordinates to determine what works, what doesn't, and what needs to change. Girard's model further supports the people, process, and product construct, just represented differently.

Alternatively, management science expert William King[89] defined KM as "the planning, organizing, motivating, and controlling of people, processes, and systems in the organization to ensure its knowledge-related assets are improved and effectively employed."[90] This definition is inclusive of specific activities of *planning*, *organizing*, *motivating*, and *controlling*, component

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[87] Ibid, 22-23.

[88] Department of National Defence, A-PA-005-000/AP-004, *Leadership in the Canadian Forces: Conceptual Foundations* (Kingston: Canadian Defence Academy – Canadian Forces Leadership Institute, 2005), 58-59.

[89] King's definitions of KM and organizational learning were deemed relevant to add to this paper as they were provided in te context of each other, hence complementary.

[90] William King, *Knowledge Management and Organizational Learning,* Annals of Information Science 4 (Dordrecht: Springer, 2009), 4.

parts of knowledge *people*, *processes*, and systems or *products*, and a purpose of *improving* and effectively *employing* knowledge-related assets. The relevance of King's definition, as compared to the current views of KM by the DND/CAF, will be explored in Chapter 3.

Organizational Learning

Similar to KM, defining organizational learning can be a daunting challenge given that the idea of organizational learning is just as debated as KM and knowledge. The description of defence organizational learning was promulgated as part of Canadian Forces General Order (CANFORGEN) 230/10 as, "organizational learning encompasses the creation of knowledge through innovation as well as the capture, transfer, adaptation, use and reuse of knowledge." Expanding on this description, the official DND/CAF definition of organizational learning is:

> The capability or processes used by an organization to create, acquire, capture and share knowledge, skills or attitude. Organizational learning involves the intentional use of learning processes at the individual, group and system level to find new and better ways of achieving the organizational mission.[91]

The *Department of National Defence (DND)/Canadian Forces (CF) Organizational Learning Strategy* expands on the definition and identifies six principles of defence organizational learning:

- Systemic problem solving;
- Experimentation with new approaches;
- Learning from our own experiences and past history;
- Learning from the experiences and best practices of others;

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[91] Defence Terminology Bank, s.v. "Organizational Learning," http://terminology mil.ca/term-eng.asp (Defence intranet).

- Transferring knowledge quickly and efficiently throughout the organization; and
- Integration of learning into management practices.[92]

Although the description, definition, and principles of DND/CAF organizational learning are complementary, the concept of organizational learning is evolving. Emerging studies continue to add fidelity and understanding of the DND/CAF as a learning organization. Scoppio added to the concept by identifying the relationship between organizational learning, lessons learned and knowledge management as, "concepts and related practices [that] are interlinked and overlap each other; that is to say, lessons learned and knowledge management are key processes to enable successful organizational learning."[93] Further, Peter Senge, an expert in organizational development, proposed a model of five "disciplines" that can be applied to the development of organizational learning in the DND/CAF:

- *Systems Thinking*. The integrating discipline that encapsulates the other four. The ability to view the environment comprehensively and appreciate the nature of relationships that are both internal and external to discrete complex adaptive systems.
- *Personal Mastery*. Described in the context of achieving individual proficiency vice dominating people or things, this discipline relates to continually clarifying and deepening vision, focusing energies, developing patience, and seeing the complex reality objectively without being clouded by limiting biases.
- *Mental Models*. This discipline espouses the creation of filters or frameworks consisting of assumptions, generalizations, and pictures or images (models) that influence perception and the decision making process toward action.

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[92] Department of National Defence, *Department of National Defence and Canadian Forces Organizational Learning Strategy* (Ottawa: VCDS, 2010), 5.

[93] Grazia Scoppio, "Learning About Organizational Learning in Defence," in *Educating the Leader and Leading the Educated: The Defence Learning, Training and Education Handbook*, ed. by Colonel Berndt Horn and Lieutenant-Colonel Jeff Stouffer, 195-208 (Kingston: Canadian Defence Academy, 2012).

- *Building Shared Vision*. Creating a common purpose by communicating shared pictures of the future that serve to enable individual commitment and engagement over merely compliance.

- *Team Learning*. This discipline starts with establishing the conditions for effective dialogue such that the team members can suspend their own assumptions and enter into a state of genuine and productive "group think." [94]

Organizational learning can be viewed as complementarily to KM, but not synonymous. King posits that KM focuses on the content (i.e., knowledge), whereas organizational learning focuses on the processes associated with the content. He further defines organizational learning as "embedding what has been learned [from the content] into the fabric of the organization"[95] so the organization "can continuously improve its practices and behaviors and pursue the achievement of its goals."[96] Hence, King's description of organizational learning builds on the one provided for KM including activities (*embedding what has been learned*), effects (*practices* and *behaviours*), and purpose (*continuous improvement* and *achievement of goals*).

Knowledge Transformation

Although defining KM and organizational learning provides part of the context for this discussion of knowledge, it does not overtly provide an overarching organizational purpose relevant to the DND/CAF today. To situate this purpose, the idea of *knowledge transformation,* as a component of a broader DND/CAF transformation, is offered. Transformation is defined by the DND/CAF as, "a continuous and proactive process of developing and integrating innovative concepts, doctrines and capabilities in order to improve the effectiveness and interoperability of

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[94] Peter Senge, *The Fifth Discipline: The Art and Practice of the Learning Organization* (New York, NY: Currency Doubleday, 1990), 6-10.

[95] King, *Knowledge Management and Organizational Learning,* 3.

[96] Ibid, 5.

military forces."[97] Currently, the DND/CAF is amidst a transformational shift catalyzed by "new threats, the emergence of disruptive technologies, new doctrine and concepts, and changing resource pressures"[98] that are driving changes in policy, structure, capabilities, and understanding across the defence knowledge enterprise.

Within the broader transformation, there is an underlying knowledge transformation that implicates organizational learning, KM, and the role of knowledge within the context of the DND/CAF mission. Knowledge transformation is inherently embedded in fundamental change influences on the DND/CAF illustrated in Figure 1.6.

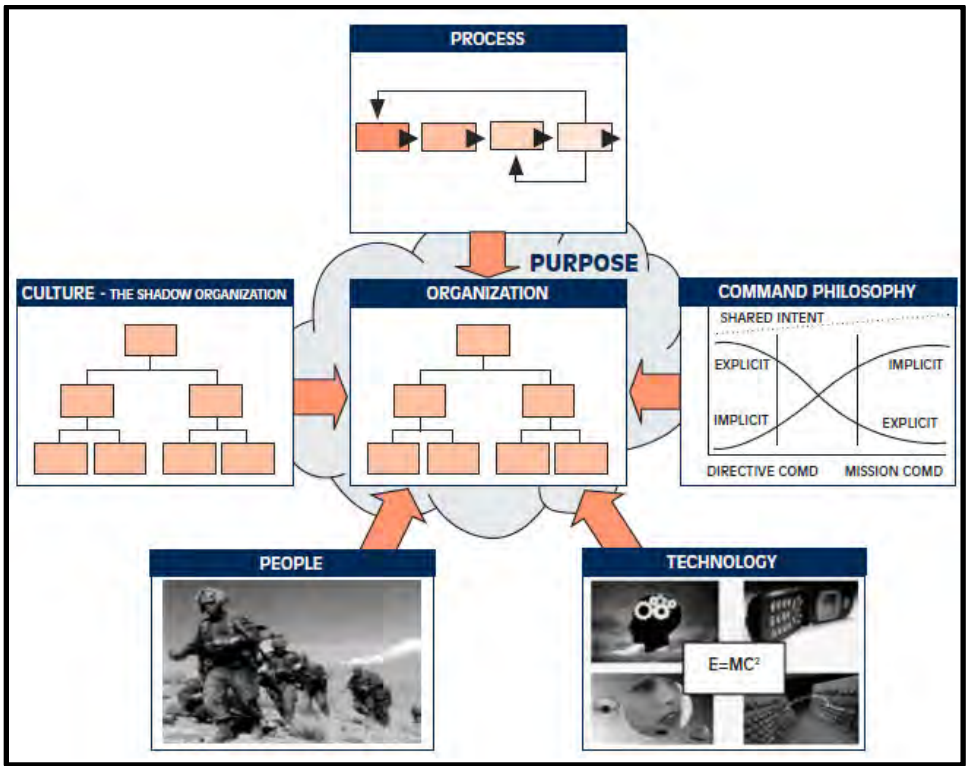

Figure 1.6 – Organizational Elements of Change
Source: Jeffery, *Inside Canadian Forces Transformation*…, 15.

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[97] Defence Terminology Bank, s.v. "Transformation," http://terminology mil.ca/term-eng.asp (Defence intranet).

[98] Michael K. Jeffery, *Inside Canadian Forces Transformation: Institutional Leadership as a Catalyst for Change* (Kingston, ON: Canadian Defence Academy Press, 2009), xi.

Whereas KM and organizational learning can be viewed as activities comprised of components with linear and bidirectional linkages, knowledge transformation consists of inherently asymmetrical relationships of influence on KM and organizational learning across the defence enterprise. Hence, change that seeks to transform the organization must balance the impacts of influences that must be balanced to maintain the coherence of the change, specifically:

- *Purpose* that binds the whole of the organization to a common mission and supporting objectives;
- *Organization* as the design of the body that divides work responsibilities, which serves as the principal organizational element;
- *Process* that describes how the various parts of the organization interact to achieve the mission and objectives;
- *Command Philosophy* that shapes the organization, generally determining the degree of centralized or decentralized control over the conduct of organizational activities;
- *Technology* that influences the size and hierarchy of the organization, with a belief that more technology results in fewer people, but greater support costs;
- *People* that are the organization, with the quality or competency of those people influencing the limitations of the organization, the technology that can or should be used, the processes required, and the command philosophy adopted; and
- *Culture* that is the personality of the organization, comprised of the values, beliefs, and behaviours that determine how things are done, or whether change will occur.[99]

The relationships between these influences, and the prominence of culture as the dominant influence, will be explored further in Chapters 2 and 3.

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[99] Ibid, 16-17.

SUMMARY

The introduction to complexity and complex adaptive systems, description of how the DND/CAF perceives the FSE, presentation of the information society, and the establishment of a proposed knowledge taxonomy sets the conditions for relating theoretical concepts to today's defence knowledge environment. Specifically, the notion of social evolution characterized by rapidly advancing technology, changing occupational competencies, and emerging cultural motivations stresses the need to overcome barriers to knowledge sharing and realize knowledge transformation objectives, such as moving towards becoming an *edge organization*. These transformations can be supported by DND/CAF embracing the comprehensive approach as it applies to organizational learning, as well as realizing that complexity is reality and complex adaptive system theory offers potential innovations for KM when dealing with the environment. Further, the taxonomy that explains knowledge as the product, learning as the process by which the product is shared and enhanced, and organizational culture as the motivation for people to change or not change, provides the basis for the disciplines of KM, organizational learning, and knowledge transformation that need to be cultivated for organizational success.

In sum, this theory-focused literature review of the contemporary knowledge environment provides knowledge context, potential objectives, and sets the stage for the analysis and propositions that follow in Chapters 2 and 3. From this context, building the logic framework that supports the argument for the continued evolution of the DND/CAF need to share culture as a critical paradigm for defence knowledge success will be shaped.

CHAPTER 2 – THE DEFENCE KNOWLEDGE ENTERPRISE

The Defence Knowledge Enterprise
Source: Generated from Chapter 2 themes using www.wordle.net

INTRODUCTION

Describing the defence knowledge enterprise merits analysis of how knowledge influences, and is influenced by, the organization in the achievement of the defence mission. The role of knowledge products in *how we do*, importance of knowledge processes in *how we come to know*, and influence of culture on transformation and *how we change* are essential elements in appreciating the nature of the defence knowledge enterprise. Using secondary source qualitative analysis of the defence knowledge enterprise, this chapter will identify gaps, opportunities, and summary deductions applicable to defence knowledge use, development, and change. First, a comparative analysis of the U.S. DoD/Armed Forces and DND/CAF KM frameworks, with a focus on the role of technology, will provide perspective on *how we do*. Next, an exploration of lessons learned, as a component of organizational learning that is reliant on process, will illuminate *how we come to know*. Finally, reflection on CAF transformation and

identification of considerations, applicable to influencing people who are otherwise biased by culture, will contribute insight into *how we change*. When combined with the context provided in Chapter 1, this analysis and the key deductions pertaining to KM, organizational learning, and knowledge transformation (denoted by grey boxes at the end of each section), will form the basis of the propositions offered in Chapter 3.

KNOWLEDGE MANAGEMENT AND HOW WE DO

U.S. Experience

The management of an organization's knowledge is a key determinant of how the people within the organization connect with each other to execute tasks. From a defence knowledge perspective, any analysis would be remiss without comparison to the largest and most complex defence enterprise in the world: the U.S. DoD and Armed Forces. Commissioned by U.S. Strategic Command (STRATCOM), Stephen Nunn and Leah Wong of the Space and Naval Warfare Command (SPARWAR) Systems Centre (SSC) Pacific conducted a study of KM across the U.S. Combatant Commands (COCOM) in order to inform the development of an operational-level KM programme across the entire U.S. Armed Forces.[100] In their report, they suggest that although there was a wide variation in terms of strategies, barriers, and practices across the COCOMs, there were common issues facing all operational-level commands, specifically:

- Lack of active support for KM from leadership, including lack of consistency in demonstrating and communicating the importance of *knowledge sharing*, leading to the contention that everyone in an organization must appreciate not only "what to share" and "how to share it," but more importantly "why to share";

[100] Stephen W. Nunn and Leah Y. Wong, "Knowledge Management for Shared Awareness," *Technical Report 2014* for U.S. Strategic Command (May 2013).

- Problems with *knowledge flow* and efficiency as a result of personnel turnover, which led to the identification of the need to improve the collection, organization, and retention of knowledge through the enhancement of tools to access, search, and discover knowledge;

- Inconsistency in *knowledge training* for KM experts and general users, resulting in the misuse of collaboration tools (e.g., Microsoft SharePoint), lack of effective policies, and a lack of coordination between sub-organizations due to inadequate or incompatible collaboration approaches; and

- Absence of explicit processes for cross-organizational *knowledge collaboration* and subsequent discovery that very little sharing of best-practices between COCOM KM teams or general users, with the exception of the use of a virtual chat room that was contributing to establishing dialogue and building relationships among KM experts.[101]

From the study, Nunn and Wong highlighted three overlapping aspects of KM that encompass critical considerations for the development of an effective KM programme: (1) People and culture; (2) Processes; and, (3) Tools and technology. *People and culture* were considered the most important dimension because knowledge only has meaning in a human context and only "moves between and benefits people."[102] Their theme of *individualism/collectivism* stressed how much or how little people tend to focus on personal gain over organizational improvement, which challenges the *willingness* to share for the benefit of others. This friction results in a need to develop the *trust* that the individual's knowledge is important to the organization, otherwise knowledge is hoarded for personal benefit (e.g., power and influence) and recognition (e.g., advancement). Nunn and Wong also emphasized the nature of the *power distance* relationship in military organizations where subordinates are unlikely to engage superiors, creating an environment where people do not feel free to share knowledge and

[101] Ibid, i.
[102] Ibid, 6.

express their ideas, and thus is a barrier to dialogue that destroys the trust that the knowledge of the individual will be appreciated by the organization.[103]

Process was analyzed in the context of the military being "mission-focused and process-driven."[104] Alluding to Castell's notion of the importance of the *space of flows*, Nunn and Wong contend that knowledge is best understood as a *process of flows* that link inputs to outputs through the capability to capture, access, search, integrate, and share knowledge by controlling the information flow. The report identifies that KM processes where not fully integrated into operational processes used by the COCOMs because the knowledge needs, operational environment, and KM techniques are derived from the organization (i.e., structurally derived) rather than of a specific mission (i.e., task derived). From their analysis, Nunn and Wong argue that the goal of KM processes is to enable the *flow of knowledge* to the right processes at the right time to make decisions (i.e., support task completion), while also *making knowledge available* to those who need it for action/function (i.e., support the structural needs).[105] In essence, to show value, KM processes must facilitate sharing of the knowledge available to, or accessible by, the organization to support the missions and tasks of the organization.

Nunn and Wong identified the role of *tools and technology*, in the context of KM, as the means to "put knowledge products and services into organized frameworks" that support the organization's mission and processes.[106] In other words, technology enables the processes and people, not the other way around. To this end, KM technology was divided into two categories:

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[103] Ibid. 7.
[104] Ibid.
[105] Ibid.
[106] Ibid.

(1) *Corporate*, which facilitate the organization, storage, and access to knowledge; and, (2) P*eople*, which facilitate communication and social networking of knowledge within the formal structure of the organization and through less formal relationships, such as CoPs.[107] As an example, it was highlighted that one such KM tool that can perform both corporate and people related functions, Microsoft SharePoint, has immense potential that can be negated by poor implementation. SharePoint offers KM functionality in the form of document storage and search, collaboration, consolidated infrastructure for organization communication (i.e., websites), and content management. However, based on observed COCOM use, effective SharePoint deployment is challenged by poor design, inadequate KM team and general user training, inability of the user to fully exploit the functionality, and a lack of control in terms of inputting information and tagging it with metadata for search.[108] KM is not "all about the technology;" however, when so much of an organization's business is reliant on the tools available to realize the value of the processes and motivate the people to adopt/adhere to policy, KM can quickly become "all about the technology" as that is what the user is directly exposed to day-to-day.

From their analysis, Nunn and Wong offer six recommendations for developing KM programmes:

- KM *advocacy* must be situated where it can be effective across the organization and supported by leadership that explicitly demonstrates that it values communication in order to increase trust and develop a willingness to share;
- KM *commitment* of the entire organization is required to affect a fundamental paradigm shift from "need to know" to "need to share," while still supporting extant "need to know" information protection policies.

[107] Ibid, 8.
[108] Ibid, 10.

Essentially, a cultural change from focusing on "hoarding and hiding" knowledge to sharing knowledge requires commitment;

- KM *training* is critical for both KM experts and general users, with adequate training on tools that support processes and are supported by appropriate policies essential;

- KM *leadership* needs to understand the organizational culture and ensure that KM initiatives support the people. KM should not be enforced through regulative measures as much as influenced by cognitive approaches that make establishing connections between people and knowledge assets easier;

- KM *uniqueness* from IM needs to be understood as the two are different, yet mutually supportive, disciplines that each have their own policies, processes, and applications; and

- KM *collaboration* must be improved, internally and externally, to support the accomplishment of inter-organization missions and tasks.[109]

The Canadian Experience

The analysis of the U.S. COCOMs bears striking resemblance to the Canadian defence enterprise, which exhibits similar gaps and is faced with many of the same complexities; also, the U.S. DoD/Armed Forces appear to be further ahead in analyzing the role, impacts, and development of KM in their organization, thus the DND/CAF could benefit from the same recommendations. As discussed by Girard, the DND/CAF leadership is still not "buying into" the value and importance of KM as a core organizational function. [110] Official policy available to the DND/CAF is still very IM focused, although some KM related concepts and imperatives have been articulated as IM initiatives.[111] However, these strategies rarely encompass the whole

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[109] Ibid, i-ii.

[110] Girard, "Defence Knowledge Management: A Passing Fad?" Indicative of the lack of "buy-in" is that the Directorate of KM, which Girard was acting Director of when he wrote this article, no longer exists as it was absorbed into other departments within the Vice Chief of Defence Staff organization.

[111] Department of National Defence, *Defence Information Management and Collaboration Strategy* (Ottawa: Assistant Deputy Minister Information Management, 2012).

of the defence enterprise and often show little value, normally only being adopted or adapted by local users or entities for limited benefit. Further, the absence of explicit acknowledgement of the importance of KM to the entire DND/CAF in the last Minister of National Defence *Reports on Plans and Priorities*, which communicates internally and externally where the DND/CAF is focusing effort, is perhaps reflective of a lack of organizational maturity with regards to KM.[112]

The absence of specific DND/CAF KM policy or priorities contributes to a lack of common understanding within the defence knowledge enterprise of what KM is and what it can do for the organization. From this lack of understanding, the DND/CAF continues to lag behind in establishing coherent KM processes, structures (e.g., resources and relationships), tools, and training as an integral component of the day-to-day operating environment. With an effective KM framework, users would be encouraged to participate in KM related activities because they see value of their effort for themselves and the organization, specifically in dealing with complexity. Essentially, having a mechanism for easily accessing and sharing knowledge across an organization supports the individual in "sense-making" and subsequently making better decisions in the face of complex circumstances. However, this improvement is not to suggest that the DND/CAF are not managing knowledge today, simply that the management of knowledge is not being done in a way that permits a systematic approach (i.e., governance) to ensure it meets the organizations needs and evolves with changing organizational missions and tasks.

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[112] Minister of National Defence, *Department of National Defence - Reports on Plans and Priorities 2013-14* (1 August 2013).

For example, similar to the U.S. COCOMs, the DND/CAF implementation of SharePoint has been limited in terms of demonstrating value to the user and fully exploiting the tools power. Within the Canadian Army, SharePoint was put in place as part of the Army Collaboration and Information Management System (ACIMS), primarily to migrate from poorly managed local share drives to a more enterprise-oriented information space that would allow the Army to meet the requirements of DAOD 6001-1 *Recordkeeping* with regards to accountability for the management and disposal electronic information holdings. Director of Land Command Information, designated as the Army IM champion on behalf of the Commander of the Army, oversaw, a significant preparatory and implementation effort, including several studies, the development of "IM experts," and a communication campaign across the Army. However, the ACIMS deployment lacked appreciation of both the knowledge needs of the users (i.e., requirements, wants, and abilities) and the knowledge needs of the organization. As a result, the ACIMS knowledge product was poorly received, underexploited, did not employ the social networking functionality that users craved, and exacerbated the information chaos it was meant to address (e.g., more unstructured content than before and new silos being poorly managed).[113] The implementation of ACIMS demonstrates that KM and *how we do* can be challenged by tools that are not properly focused on connecting people and the knowledge they have to contribute, thus not creating value to the common user and the organization.

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[113] This is based the author's first-hand account of ACIMS and anecdotal from the perspective of a member of the Army IM Development team on and off from 2007 to 2013. Although the team started with a more comprehensive view of the problem space and an engagement strategy that encompasses the people (IM experts and general users), processes (strategic, operational and tactical), and products (technology, tools, and artefacts), the pressure to meet recordkeeping policy mandates scoped the implementation to more of a single-focus effort: migrating share drives and other repositories to SharePoint. Hence, SharePoint was deployed without adequate understanding, design, or training on what the author contends the users were actually interested in, which is the ability to: customize workspaces; retrieve information; collaborate; share; and have the archiving function be transparent to the user.

Defence Knowledge Deduction #1

Effective KM requires leadership, education, collaboration, and properly deployed knowledge products that host explicit knowledge and connect people so that they can share knowledge day-to-day to more effectively deal with increasingly complex problems. "Bottom-up" support for knowledge sharing initiatives is reliant on demonstrating the value of, and commitment to, the culture of sharing as part of the KM programme, which can be enhanced by providing technology that allows the users to build relationships and connections that contribute to the organizational knowledge needs.

ORGANIZATIONAL LEARNING AND HOW WE COME TO KNOW

How an organization learns is dependent on how the organization institutionally cultivates and embeds what it has learned into the training, education, experience, and self-development of its people. As identified in the *DND/CAF Organizational Learning Strategy*, organizational learning encompasses the creation, acquisition, and sharing of knowledge, skills, or attitudes to improve the organizations ability to achieve objectives.[114] The strategy lays out six goals:

- *Enhance collaboration* through the interactions of people actively sharing data, information, and knowledge toward a common purpose;
- *Manage content effectively* using document and records management tools that allow users to retrieve and leverage previously created content;
- *Learn from our own experiences* by analyzing successes and failures with a view to increasing efficiencies and avoiding costly errors;
- *Learn from other organizations* by looking outside the organization and benefiting from the experiences of other similar organizations to gain insights and new perspectives;
- *Leverage our knowledge* by ensuring that critical knowledge garnered by the people is not lost to retirements, member transiency (e.g. relocation, appointments, leaving defence), and functional changes to the organization; and

[114] Department of National Defence, *DND and CF Organizational Learning Strategy*, A-3.

- *Foster a culture of continuous learning and innovation* by empowering members to participate in the creation and enrichment of knowledge and knowledge related processes.[115]

Although organizational learning is more than lessons learned, analysis of the DND/CAF lessons learned programme offers insight into potential gaps and opportunities applicable to organizational learning within the defence knowledge enterprise. A comprehensive report on DND/CAF lessons learned[116] is provided by Canadian defence strategic analyst Andrew Godefroy. The report reviewed the evolution of the DND/CAF lessons learned philosophy, discussed its impact on knowledge and learning related policies, and identified gaps between lessons learned and organizational learning processes that should be considered during future force development. The report recommends the DND/CAF focus on four areas to enhance organizational learning across the defence knowledge enterprise:

- Lessons learned and associated organizational learning tools must enable *knowledge sharing* capabilities, similar to those used by commercial and private research sectors that encourages and rewards user-based value creation;

- Knowledge policies and policy change can be undermined by a lack of resources, non-committal leadership, and limiting participation to representative agents in lieu of giving all members a voice, thus resulting in ineffective *knowledge processes* for dissemination and education of lessons learned;

- KM strategy is focused on repairing current gaps while ascribing to emerging trends, with little appreciation or emphasis on future *knowledge development* to create a more holistic learning framework that encompasses the military and potential comprehensive approach partners; and

- Organizational learning *knowledge initiatives* are reliant on the community's belief that the organization is serious about promoting the

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[115] Ibid, 6-11.
[116] Godefroy, "Lessons Learned About Lessons Learned."

> initiative and developing the supporting processes, which needs to support broader dialogue between responsible establishments (i.e. schools) and the organization writ-large.[117]

In his analysis, Godefroy identified the reintroduction of a robust organizational lessons learned vision and policy in response to the operational defence requirements following the events of September 11, 2001, as a formative influence on the current the DND/CAF.[118] Whereas the post-Cold War approach to compartmentalizing formal lessons learned policies and frameworks within sub-organizations (i.e., the environmental services) were yielding beneficial effects, these approaches needed to be merged into a coherent and integrated organization-wide body of policy. The result was the issuance of DAOD 8010-0 *Lessons Learned* and DAOD 8010-1 *Operational Lessons Learned Process* as the first comprehensive approach to institutionalizing DND/CAF lessons learned since the 1990s. From these policies, a renewed lessons learned framework that sought to integrate all DND/CAF processes, clarify organizational responsibilities, and establish common governance, emerged. Under the oversight of the Chief of Force Development (CFD), as the manager of common force development across the defence knowledge enterprise, the focus of this new lessons learned framework was to develop a broader, all encompassing, lessons learned process from which the entire organization can benefit.[119]

Following an analysis of lessons learned authorities, agencies, and processes that exist or existed within the DND/CAF,[120] revealing the organizational structure that manages the learning

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[117] Ibid, 5.
[118] Ibid, 11.
[119] Ibid, 12.
[120] Ibid, 12-34.

processes that need to be integrated, Godefroy presents six challenges the DND/CAF faces in realizing a comprehensive lessons learned/organizational learning framework. The first of these challenges is the development of a pan-DND/CAF *knowledge strategy*[121] that supports unification of internal efforts and harmonization with external influences and agencies. At the centre of current DND/CAF strategy development is the *Canada First Defence Strategy*, which despite mandating the need to "encourage[e] the continued development of a knowledge-based workforce" [122] lacks explicit guidance for the development of the DND/CAF as a learning organization. The *Canada First Defence Strategy* does, however, provide a unifying set of objectives, framed within the imperatives of defending Canada and North America, as well as contributing to international peace and security, which form the basis of a common vision across the DND/CAF. This vision has been situated in the context of the FSE as the guiding document for force development within the DND/CAF, although there is still no common formal linkage between lessons learned, organizational learning, and the comprehensive approach, or how these processes will contribute to that force development, hence resulting in a knowledge strategy gap.

The second challenge is *knowledge policy*. Although strategic and operational-level policy link the DND/CAF lessons learned, education, and training framework to GoC expectations articulated in the *Canada First Defence Strategy*, gaps in the authority framework remain. Most noticeably, DAOD 8010-0 and DAOD 8010-1 have yet to be officially updated since the 2006 DND/CAF reorganization that resulted in the Deputy Chief of Defence Staff

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[121] Ibid, 35-37.

[122] Government of Canada, *Canada First Defence Strategy* (Ottawa: Minister of Supply Services, Public Works Canada, 12 May 2008), 16.

group being dissolved and a new CAF command structure put in place.[123] However, the first round of CAF structural changes were addressed in Joint Doctrine Note (JDN) 04/08,[124] which identified CFD, an organization under the Vice Chief of Defence Staff (VCDS), as the authority for joint lessons learned and force development, with a Lessons Learned Working Group (LLWG) as the committee to integrate lessons learned priorities across the enterprise. Despite the designation of a single DND/CAF authority and mechanism to inform priorities, Godefroy contends that the Environmental Chiefs of Staff (ECS)[125] still possess too much latitude in their ability to ignore the LLWG, conduct their own interpretation of lessons learned policy, and exercise "command prerogative" in the management of what they view as their own internal lessons learned frameworks.[126] Essentially, the ability of the existing body of policy to create a unified lesson learned and organizational learning approach is challenged by CFD's inability to impose lessons learned direction across the organization, specifically to the ECSs.

The third challenge is with the *knowledge institutions*. Despite deficiencies in strategy and policy, each of the formally identified knowledge contributing organizations committed time and resources to support DAOD 8010 and 8010-1, however investment has not been ubiquitous within the DND/CAF.[127] Development of an understanding of the integrated lessons learned, education, and training framework beyond specialist lessons learned communities has been hindered by a lack of investment across the entire defence knowledge enterprise to educate the

[123] The DCDS group was replaced in 2006 with four operational-level commands, to be discussed on the next section. The most recent round of changes merged CEFCOM, Canada COM and CANOSCOM into the Canadian Joint Operations Command (CJOC) in 2012.

[124] Department of National Defence, *The Lessons Learned (LL) Process* (Canadian Forces Experimentation Centre Joint Doctrine Note 04/08, May 2008).

[125] Environmental Chiefs of Staff are: Commander Royal Canadian Navy; Commander Royal Canadian Air Force; and Command Canadian Army.

[126] Godefroy, "Lessons Learned About Lessons Learned," 39.

[127] Ibid, 39-40.

general DND/CAF population. This lack of common understanding has resulted in resistance to changes that seek to unify learning efforts, as it is perceived that such changes would potentially result in a loss of sub-organization control and effectiveness of their own lessons learned programmes. Further, the identification and organization of lessons learned agencies, without assigning the requisite authority for them to act, brings into question the relevance and credibility of the centralized control and decentralized execution architecture being espoused within the lessons learned policy.[128] The result of an inadequate organizational structure, without appropriate responsibilities and authorities that can be orchestrated from a single controlling entity, is an inability to effectively adapt and evolve to changing priorities and influences across the defence enterprise in a coordinated manner. Finally, the lack of human resource investment, inclusive of vacant positions, reduction in manning, and high turnover of lessons learned "experts," limits the ability of any proposed lessons learned, education, and training framework to achieve anything beyond short duration, localized effects.[129]

The fourth challenge is that of *knowledge processes*. Although it is recognized that a common template for a singular lessons learned process across the entire DND/CAF is not required as "one solution does not fit all problems,"[130] a common set of standards is still required to ensure that the lessons learned processes within the organization are not overly diversified and remain compatible with each other. This requirement to standardize the lessons learned, education, and training framework across the defence knowledge enterprise is challenged by the following: lack knowledge experts who share similar expertise; limited value in supporting a

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[128] Ibid, 40-41.
[129] Ibid, 42.
[130] Ibid.

seemingly linear and dogmatic process perceived by DND/CAF personnel who are trying to achieve dynamic effects; and the reluctance to adopt and employ common tools, such as the Knowledge Management System (KMS).[131] Whereas the development of experts, or expertise garnered from experience, seems to be occurring naturally with the various DND/CAF lessons learned approaches "settling into a standardized four-step process (observe, collect, analyze, recommend),"[132] creating a common perception of relevance to the general DND/CAF population in terms of analysis and subsequent process improvement is still hindered by an immature and under resourced architecture. Godefroy observed that new approaches to engage the broader DND/CAF community, with inclusion of WoG and outside agency stakeholders, are required to make the processes accessible, adaptable, engaging, as well as relevant to the entire organization and not just commanders and supporting lessons learned staff.[133]

The fifth challenge is *knowledge technology*. The crux of the technology challenge is that of managing expectations between what the common user experiences on the Internet (e.g., social networking, chat, wikis, blogs, and file sharing) and what they experience on a much more restrictive and perceived as less intuitive Defence Information Network (DIN) intranet.[134] The functionality that defence users are coming to appreciate and rely on in their personal lives is not being replicated in their professional employment; hence the DIN has become something they have to use, while the services associated with the Internet is something they want to use. However, the issue is less about the technology and more about the DND/CAF not taking steps

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[131] Knowledge Management System is a joint lessons learned repository managed by the Canadian Forces Warfare Centre, currently under Chief of Force Development, but responsive to Commander CJOC.

[132] Godefroy, "Lessons Learned About Lessons Learned," 45.

[133] Ibid.

[134] Ibid, 46-47.

to optimize the tools available to close the gap in desired functionality between personal and professional ICTs. Defence users who lack adequate training on the tools available to them are limited in their ability to use those tools to support work flows, which includes developing, inputting, accessing, and obtaining value from lessons learned, education, and training related processes that are supported by technology. Despite small advances made with collaborative technologies, such as KMS and SharePoint, until the DND/CAF introduces training programmes and educate their users on what they can do with, and how they can benefit from, the technology provided to them, the DIN tools will continue to appear lacking in the eyes of the common user and the organization.

The final challenge is *knowledge culture and community*. Godefroy contends that the DND/CAF has, "fallen short on recognizing emerging organizational learning challenges related to its culture and community."[135] Within a mixed military-civilian organization, it is critical to recognize that the influences on adopting lessons learned, education, and training frameworks go beyond merely directing changes. There must be institutional buy-in and the community must see value in the change, while believing that the organization is actually committed to the process of changing. To that end, it was observed that friendships matter and the relationships formed among lessons learned facilitators surrounding both the processes and the tools are key determinants of acceptance. Further, and in keeping with the theme of seeing value in the effort, individuals will only embrace change if there is an incentive to do so. Policies, processes, and technologies that are implemented in a manner that is perceived as disruptive, burdensome, or lacking tangible benefit will be resisted by the user. Hence, Godefroy highlighted lack of user

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[135] Ibid, 48.

awareness of the lessons learned process, lack of perceived value of KMS to individuals outside the lessons learned or training development communities, and the belief that lessons learned and supporting applications are specialist staff tools vice common user resources as factors limiting the evolution of lessons learned, education, and learning culture in the DND/CAF.[136]

There have been positive aspects of the programme, as Godefroy ends his report by highlighting four opportunities where the DND/CAF lesson learned programme has advanced:

- *Integration* through the LLWG as a centralized governance mechanism that monitors, makes recommendations, and coordinates the DND/CAF lessons learned programme. The LLWG provides a forum for DND/CAF stakeholders to meet and discuss lessons learned activities, while affording a venue to lobby for a unified approach to lessons learned in terms of processes, resources, and priorities;

- *Sustainability* as a priority of the current lessons learned programme to be achieved by addressing current learning process gaps. To support existing processes that must continue to converge, the pursuit of agile and robust DND/CAF policy and the development of better tools contribute to broadening the applicability of lessons learned processes across the defence knowledge enterprise;

- *Amelioration* of forecasting the future to shape steps to improve the pan-DND/CAF organizational learning, information sharing, and KM frameworks. Key to this development is the cultivation of an organizational learning culture that is recognized by senior leadership who communicate the importance of a professional learning cycle, supported by policy and enabled by technology, to promote knowledge sharing. With this culture, the motivation exists to invest in the ability to anticipate where defence learning needs to evolve, identify changes in policy and processes to enable a comprehensive approach, and integrate relevant lessons from across the defence knowledge enterprise; and

- *Connections* between lessons learned, individual and collective training, and education characterized by strong linkages of joint and environmental lessons learned organizations with their respective doctrine and training authorities. As these connections continue to mature the lessons learned,

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[136] Ibid, 49.

> training, and education processes become more integrated, thus showing value in turning a lessons learned into an institutional change that can be identified and assessed.[137]

From the preceding analysis of lessons learned, considerations that are applicable to organizational learning and *how we come to know* are presented. Specifically, policy that is implemented without the right supporting structures and authorities will be limited in its ability to create a unified framework of common, integrated, and relevant processes across the defence knowledge enterprise. This disparity in process hinders the DND/CAF ability to prioritize resources and develop solutions that engage the users, internal and external to DND/CAF, and encourage participation towards sharing knowledge to enable organizational learning. As a result, the ability to achieve organizational learning goals set out in the DND/CAF Organizational Learning Strategy is at risk.

Defence Knowledge Deduction #2

Organizational learning requires enforceable policy, integrated processes, appropriate technology, and constant development. Organizational learning focuses on sharing what has become known to achieve iterative improvements across the defence knowledge enterprise and needs to promote institutional adaptation as a "middle-out" activity, with knowledge establishments (e.g. schools, training centres, doctrine directorates) being enablers of the organizational learning framework.

KNOWLEDGE TRANSFORMATION AND HOW WE CHANGE

The concept of organizational transformation encompasses changes to an organization in response to internal and external pressures that demand new ways of conducting business. The DND/CAF is in a constant state of change, inclusive of the "emergence of new structures, the

[137] Ibid, 50-52.

acquisition of new equipment with different capabilities, the adoption of new technology, or the development of new processes"[138] that fundamentally alter the defence knowledge enterprise. Over the last two decades, from the end of the Cold War and the supposed peace dividend, followed by the events of September, 11, 2001 and the commencement of the Global War on Terror (GWoT), the DND/CAF has undergone significant internal organizational changes in response to myriad external influences. These changes have resulted in low points characterized by force reduction and institutional decay in the 1990s and high points of defence renewal and operational excellence demonstrated during the war in Afghanistan. The current organizational transformation has once again placed the DND/CAF in a state of transition as Canadian commitments abroad have been scaled back, the Canada First Defence Strategy is being refreshed, and the GoC pushes an agenda of fiscal reduction on the way to election in 2015. However, despite the current geopolitical and fiscal environment, by analyzing the most recent CAF transformation, insights into change related challenges, and best practices specific to the DND/CAF, can be garnered for application to knowledge transformation in the future.

In his review of CF Transformation,[139] Lieutenant-General (Retired) Michael Jeffery provides his analysis and reflection on the changes to the CAF under the leadership of General Rick Hillier, Chief of Defence Staff (CDS), between 2005-2008. [140] These changes resulted in a fundamental realignment of the CAF C2 framework, with the dissolution of the DCDS and creation of four operational commands on 1 February 2006, including Canada Command

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[138] Michael K Jeffery, "Inside CF Transformation." *Canadian Military Journal* 10, no. 2 (Spring 2010), 9.

[139] Canadian Forces Transformation is the term that will be used to refer to the specific organizational transformation in 2006 under General Hillier.

[140] Jeffery, *Inside Canadian Forces Transformation….*

(Canada COM), Canadian Expeditionary Forces Command (CEFCOM), Canadian Special Operations Forces Command (CANSOFCOM), and the Canadian Operational Support Command (CANOSCOM), as well as the stand-up of a smaller Strategic Joint Staff (SJS) directly supporting the CDS. This realignment of the very top of the CAF hierarchy was designed to improve the military's joint operations focus by separating the force employers from the strategic departmental management and environmental force development/generation functions, as well assigning the conduct of domestic, expeditionary, special, and joint support operations to the new operational commands.[141]

Hillier's pre-2005 reasons for transformation of the CAF were three-fold. First, it was assessed that the CAF's force structure and operational doctrine, which was primarily environmental service-based with a conventional warfare focus, lacked relevance within the new reality of modern defence and security. It was believed that the CAF could not afford to maintain large, resource intensive capabilities suited to industrial conventional warfare that required adaptation to more asymmetric, non-conventional operations when tasked. Hence, the creation of an operational-level of command with a joint focus was seen as the solution to aligning the DND/CAF efforts to what was happening in the security domain.[142] Second, there was a recognition that the CAF was operating within a bureaucratic and efficiency-oriented management process, which focused on departmental governance and force generation of capabilities that could be handed over to multi-national command, hence command ownership of missions and operational effectiveness were not always at the forefront. Given the potential consequence of CAF failure to Canada, it was reasoned that military leadership needed to have a

[141] Ibid, 29-32.
[142] Ibid, 41-42.

more active role in the conduct of operations, be they domestic or abroad, which a focused operational-level command structure could provide.[143] Finally, there was a perception that an environment-oriented service culture (maritime, land, air) was impeding CAF effectiveness and was a major limitation to achieving CAF operational excellence. The three environmental services tended to operate within their own silos of expertise, competing for resources, and cultivating their own service-oriented views of the world and the DND/CAF mission, which limited the organizations ability to leverage the full breadth of expertise, resources, and capabilities on joint operations. By establishing the operational-level of command, responsible for the conduct of operations, it was believed that the environmental services would become better integrated and more adaptable to changing operations, thus optimizing the effectiveness and efficiency of the resources within the DND/CAF.[144]

From the analysis of the motives for CF Transformation, General Hillier communicated a vision that sought to create a Canadian military that was more:

- Effective as an integrated maritime, land, air, and special operations organization that could focus effects, deploying the right mix of forces to the right place, at the right time, to produce the right result;
- Relevant domestically and in support of international missions by being able to adapt capabilities and force structures to deal with new threats, specifically those associated with instability and failed states; and
- Responsive to crises by being able to act quickly, arrive on scene faster, rapidly transition to operations, and conduct tasks more effectively through enhanced maneuver and sustainment.[145]

[143] Ibid, 42-44.

[144] Ibid, 44-45.

[145] Ibid, 45-46.

In his assessment of how the vision and intent for CF Transformation was enabled and challenged, Jeffery provides three broad factors that he believes were at the core of determining change success or failure:

- *Communicating the vision* of change requires charismatic leadership that engages individuals internal and external to the organization, telling a story that captures the imagination and inspires support. General Hillier was a charismatic leader whose public image resonated with members of the CAF and the Canadian public, enabling him to generate interest, enthusiasm, and support for the change

- *Achieving a shared vision* and intent requires support of executive level leadership who can carry the message to the organization with support gained through seeing the intended outcome of the change as favourable to what the individual and organization believes is important. General Hillier overestimated his ability to convince his senior leaders of the value of the change, failing to take the time to sway those who did not agree or amend the vision prior to moving forward. The realization that CF Transformation was going to have winners and losers resulted in the executive leadership not fully embracing it to the point where trade-offs could be supported and the change could become self-sustaining.

- *Unity of thought and effort* in change requires balanced participation across all levels of the organization, not just reliance on the efforts of like-minded people. General Hillier started the change initiative by attempting to create pan-CAF dialogue in the spirit of building a collegial approach with the expectation of harmonizing perspectives across the organization. However, skepticism began to emerge based on a lack of assurance from government that the breadth of the change would be supported. This skepticism eroded senior leadership buy-in and resulted in the inability of the organization to accept the risks associated with the change initiative. The effect of the lack of buy-in was an absence of the desired level of unity, which in turn dislocated the senior leadership from fully supporting the change and creating the level of commitment required to sustain the overall vision and intent beyond initial implementation of the change.[146]

Analysis of the CF Transformation provides value in appreciating how fundamental organizational change can be approached; however, it must be recognized as overt and

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[146] Ibid, 55-58.

significant structural change, directed from the top and initiated over a short period of time that was intended to initiate more subtle changes as after-shocks within the organization (e.g., changes to service culture). When applying the considerations, observations, and lessons learned from CF Transformation to knowledge transformation in the context of an evolving information society, it must be realized that the approach will be different. Knowledge change is less overt (i.e., likely no major structural changes), more incremental over a longer period of time, yet no less fundamental in how it alters the organization. To this end, the lessons learned from CF Transformation provide an adequate basis of *how we change* from which to shape DND/CAF knowledge transformation in the future.

Defence Knowledge Deduction #3

Knowledge transformation initiatives must consider the full breadth of the organizational influences, inclusive of purpose, organization, process, command philosophy, technology, people, and culture. The success of change is reliant on establishing a common vision that embodies the purpose and is supported by the people who are biased by their culture. To achieve buy-in to knowledge transformation, a "top-down" yet participative engagement is required that reflects senior leadership perceptions so that they commit to the change and communicate the value across the defence knowledge enterprise.

SUMMARY

This analysis of today's defence knowledge enterprise adds perspective to the theory presented in Chapter 1, while providing considerations for the synthesis and development of propositions in Chapter 3. From the deductions, the underlying purpose of KM is to connect people to the knowledge they require to make sound and timely decisions in the face of complexity; a goal that requires bottom-up adoption of technology. Organizational learning captures what is known by people and integrates it into the organizational body of knowledge; an

action that requires middle-out integration of processes. Knowledge transformation changes the organizational paradigms that influence how knowledge is managed and learned; an evolution that will succeed or fail based on top-down communication of vision. Common to the analysis of KM, organizational learning and lessons learned, and knowledge transformation, were the themes of perceiving value, communication, participation, and cultural biases that can contribute or hinder transitioning to a need to share cultural paradigm. These ideas will be explored further in Chapter 3.

CHAPTER 3 – RE-CONCEPTUALIZING DEFENCE KNOWLEDGE

Re-conceptualizing Defence Knowledge
Source: Generated from Chapter 3 themes using www.wordle.net

INTRODUCTION

Re-conceptualizing *what is to what could be* in the context of defence knowledge serves to highlight gaps in existing capabilities and approaches, as well as identify opportunities that could be leveraged if the organization is able and willing to envision change. Having presented knowledge theories and analyses, this chapter will provide a synthesis from which to *re-conceptualize* the defence knowledge enterprise, represented by the *Integrated Defence Knowledge Model*.[147] First, the author's idea of a knowledge space will be offered to provide structure to this chapter, linking the day-to-day operating, institutional development, and cultural influence spaces as unique, yet interdependent, component parts of the same whole. Next, KM functions and activities in the operating space will be proposed as part of a new way of looking

[147] The Integrated Defence Knowledge Model depicts the linkage between KM, organizational learning, and knowledge transformation. The model will be built in component parts (figures 3.3 to 3.6), starting with KM functions and activities, then adding organizational learning approaches and effects, and then finishing with knowledge transformation influences. Each component part will be explained as it is added to the model.

at the defence KM framework, with specific focus on how this framework can inform more effective and efficient use of technology to share knowledge. Building on the KM framework, organizational learning approaches and their effects in the institutional space will be presented, with emphasis on the need to integrate knowledge processes that govern and support the flow of knowledge across the organization to support sharing. Knowledge transformation that is motivated within the cultural space will be identified as the means to promote or prevent knowledge change within the organization, dominated by the cultural influences that bias the members of the organization. Finally, a vision of defence knowledge will be described with the introduction of the "Knowledge Cube," which is an illustration of how technology could be used to support the learning processes that enable the organization to better create, collaborate, communicate, and incorporate defence knowledge. Throughout this chapter, proposed knowledge truisms[148] and current knowledge initiatives as adjuncts, denoted by grey boxes at the start and end of the KM, organizational learning and knowledge transformation sections, will aid in focusing reflection through possible defence knowledge enterprise attitudes.

KNOWLEDGE SPACE

KM, organizational learning, and knowledge transformation are inter-related component parts of the same defence knowledge whole that can be represented by the idea of *knowledge space*. This knowledge space (Figure 3.1) comprised of three distinct, yet constantly interacting and interdependent, domains: that of, (1) Operating Space; (2) Institutional Space; and (3) Cultural Space.

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[148] *Merriam-Webster Online*, s.v. "Truism," http://www.merriam-webster.com/dictionary/truism . The proposed truisms could also be interpreted as clichés that serve to illustrate the spirit of sharing as it applies to KM, organizational learning, and knowledge transformation.

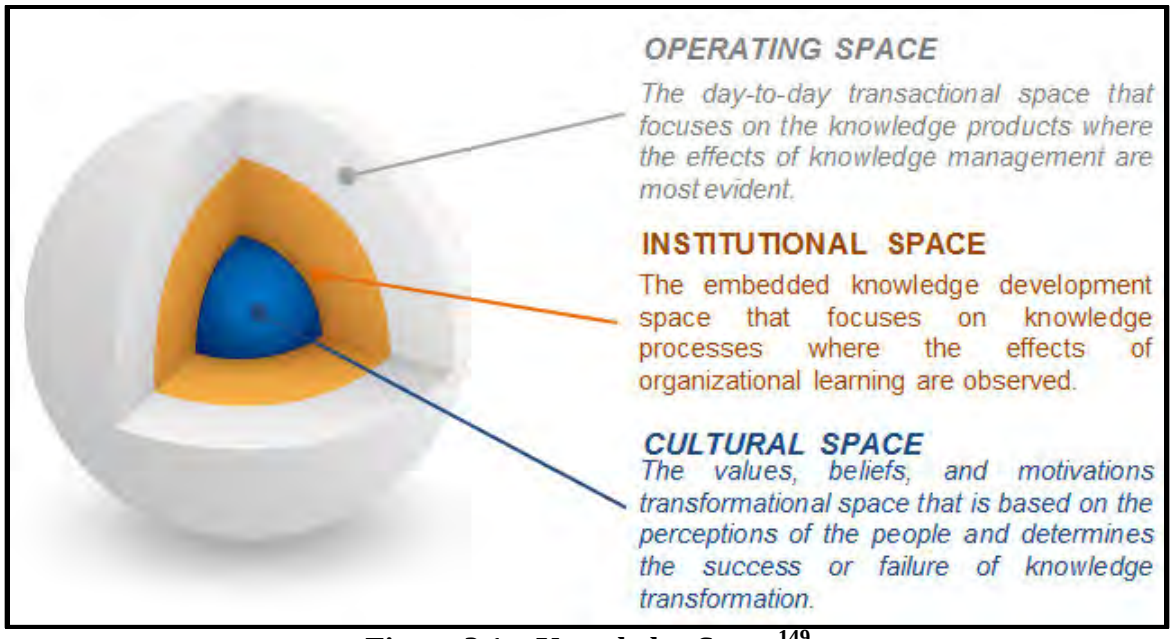

Figure 3.1 – Knowledge Space[149]

The *operating space* encompasses the day-to-day activities of individuals within the organization. These activities are predominantly transactional in nature and primarily focused on the effective use of the *knowledge products* (i.e. content and systems) to complete tasks, hence KM is most evident in the Operating Space. The *institutional space* is the sum of the organization's embedded knowledge, which sets the conditions for success in the operating space by providing a foundation that supports the day-to-day tasks within the organization. This domain is developmentally focused and reliant on improving the *knowledge processes* within the organization, hence organizational learning is most evident in the institutional space. Finally, the *cultural space* is at the core of both the institutional and operating spaces as it encompasses the sum of the organizations values, beliefs, and motivations. Given that values, beliefs, and motivations are the purview of *people*, any knowledge transformation of the DND/CAF requires a change of organizational perception within the cultural space.

[149] The author created figures 3.1 to 3.8 in order to assist the reader in visualizing the proposed elements of KM, organizational learning, and knowledge transformation, as well as illustrate how doing, learning, and changing are interrelated.

KNOWLEDGE MANAGEMENT IN THE OPERATING SPACE

Proposed Knowledge Truism #1

"*Many hands make light work*"

The ability of an organization to effectively deal with the complexity of the *operating space* is dependent on the members of the organization being able to apply the right knowledge at the right time to achieve the best possible outcomes. This knowledge exists both internal and external to the organization, resident in the people, processes, and products that the organization can use to collectively build a picture of the environment, identify problems and opportunities, and make decisions to achieve objectives. As identified in the mental model proposed by Paparone et al,[150] by viewing the DND/CAF as a complex adaptive system and adopting a new set of leadership tasks to enable the organization to better deal with complexity, the potential energy of knowledge can be converted into power more easily. In order for the potential energy of knowledge to be harnessed, a KM framework is required. This framework needs to be commonly applied across the organization, while remaining flexible to changes as new knowledge is discovered and innovation is required or desired. To this end, what follows is a proposed set of KM functions and activities focused on knowledge products to support people and processes, which provide value only when knowledge sharing is encouraged and enabled by the entire organization. Essentially, these models will illustrate how sharing among the collective benefits the organization and supports the *many hands make light work* truism.

[150] Paparone et al, "Where Military Professionalism Meets Complexity Science...," 441.

Knowledge Management Functions

Providing a framework of interrelated functions to describe how knowledge is and should be managed is central to building an understanding of KM within the organization. By building on Girard's Inukshuk Defence KM model,[151] Figure 3.2 provides a slightly different perspective from which to re-conceptualize defence KM and integrate its action-oriented functions inclusive of create, collaborate, communicate, and incorporate.

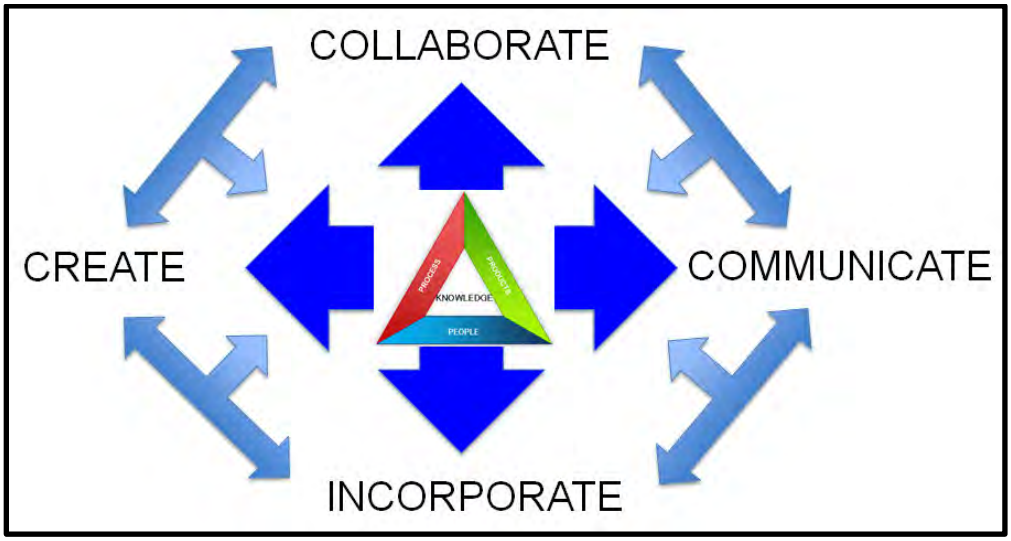

Figure 3.2 – Knowledge Management Functions Model

Central to the model is knowledge, which is represented by people, processes, and products. The first KM function is *create*, which encompasses the identification, acquisition or retrieval, conversion, and articulation of knowledge between people with each other and people with technology. Knowledge creation facilitates knowledge conversion[152] by leveraging relationships that are enhanced by loose coupling that allows for the flexibility to discover and acquire knowledge outside rigorously prescribed vertical and horizontal relationships. Knowledge creation occurs between: (1) People for the purpose of converting tacit knowledge through

[151] Girard, "Defence Knowledge Management…," 21.
[152] Nonaka and Takeuchi, *The Knowledge Creating Company…*, 62.

socialization; (2) People and technology to convert tacit to explicit knowledge through externalization; (3) Technology and people to convert explicit to tacit knowledge through internalization; and (4) Within the technology to convert explicit to explicit knowledge through combination. The effectiveness of knowledge creation is reliant on the connections internal and external to the organization that are cultivated between individuals, as well as the ability of the individuals and the organization to use interconnected technology as both a repository of explicit knowledge and a means to access tacit and explicit knowledge required to perform tasks day-to-day.

The second KM function is *collaborate*, which enriches or adapts knowledge that has been created by enabling collective participation towards developing that knowledge. Knowledge collaboration supports placing information into context or applying existing knowledge in new contexts by leveraging diverse perspectives that can contribute to sense-making. Collaboration is an inherently social function based on a shared purpose that can only occur between people,[153] but can take on different forms in terms of time and space. For example, synchronous collaboration can occur between people who are physically or virtually co-located (e.g., a meeting or video conference), or asynchronous collaboration can be achieved by using customizable virtual tools like blogs, wikis, and electronic discussion boards. Further, the choice of how the collaboration environment is structured will determine the type of outputs achieved. More structure (e.g., role-defining, standardization, socializing, and planning based on estimates) focuses the collaboration effort on production, whereas less structure (e.g., relationship building, loose coupling, diversifying, and emergent thinking) creates the conditions

[153] Collaboration is a function where communities of practice excel due to their ability to connect and share expertise or perspectives with each other and develop new knowledge that may be relevant to tasks at hand.

for innovation (e.g., improvising) and discovery (e.g., sensemaking).[154] Knowledge collaboration is reliant on the willingness and ability of people to share knowledge in a manner that suits the intended output of the collaboration while being convenient, or at least justifiable, to the collaborators.

The third KM function is *communicate*, which is the distribution, dissemination, and sharing of knowledge to specific individuals and groups, or across the organization writ-large. Knowledge communication packages what has become known through creation and collaboration and makes it available to others in order to contribute to sensemaking and learning.[155] Effective knowledge communication requires selection of the right form, format, and medium to represent the knowledge and create meaning to a desired audience. Appreciating the audience and how best to communicate knowledge to them allows the communicator to craft an effective message using the available resources that support that message. For example, whereas a commander or senior manager may be able to effectively communicate knowledge of their vision or intent to their supporting staff by continuous interaction over time, that same vision or intent may lose meaning when published as text on a website unless crafted to be internalized by the intended audiences (e.g., appealing to values and ethos and presenting in an attractive manner).[156]

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[154] Paparone et al, "Where Military Professionalism Meets Complexity Science...," 441-445.
[155] Ibid, 444.
[156] Girard, "Defence Knowledge Management…," 23.

The final KM function is *incorporate*, which unifies something that already exists so as to "form an indistinguishable whole,"[157] and captures, archives, and integrates specific knowledge into the broader professional body of knowledge of the organization. Similar to knowledge communication, effective knowledge incorporation must consider the form, format, and medium to represent the knowledge so it can be integrated into the professional body of knowledge and retrieved when and where required. Hence, when knowledge is incorporated it needs to be linked to other knowledge by providing context that facilitates classification for the purpose of identification and retrieval by potential users. Generally speaking, knowledge incorporation is where KM supports organizational learning by embedding what has become known through experience into the fabric of the organization.[158]

Knowledge Management Activities

KM activities are the actions that set the conditions for the KM functions by deliberately changing or managing the organizations KM framework. Adapting King's definition of KM,[159] the activities of planning, organizing, motivating, and controlling can be thought of as surrounding the KM functions, as illustrated at Figure 3.3.

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[157] *Merriam-Webster Online*, s.v. "Incorporate," http://www merriam-webster.com/dictionary/incorporate

[158] Incorporation is a function where centres of excellence can contribute to the development of the organizations professional body of knowledge by being both a filter and 'clearing house' of formal and informal knowledge relevant to the organization.

[159] King, *Knowledge Management and Organizational Learning*, 4.

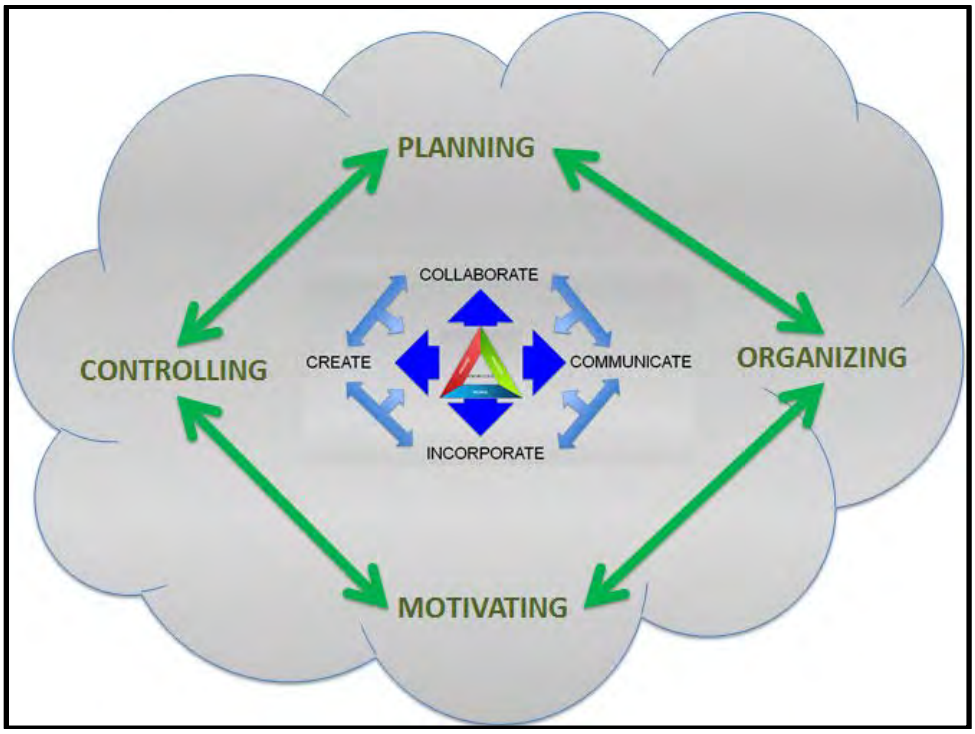

Figure 3.3 – Integrated Defence Knowledge Model (Knowledge Management Activities)

KM *planning* is an iterative and recursive activity that starts with identifying the knowledge objectives of the organization, the knowledge resources available or required to support those needs, the possible knowledge structures (i.e., people, processes, and products) that could satisfy those needs, and the knowledge competencies necessary to implement and work within the proposed knowledge structure. KM *organizing* is the implementation of the chosen knowledge structure, which is supported by change management practices such as communicating a vision or intent, appropriate resourcing, and providing education and training to the users. KM *motivating* is achieved by demonstrating leadership commitment to the knowledge structure, showing value, ensuring inclusiveness of the affected community in developing the structure, and providing incentives and rewards for adopting/improvement. Finally, KM *controlling* is the oversight of the knowledge structure that makes corrections or adjustments to overcome possible

issues and prevent users from being able to "wait out" the change or "work around" the knowledge structure.[160]

The proposed KM portion of the Integrated Defence Knowledge Model forms the basis of a KM framework that integrates KM functions and activities to make better use of knowledge within an organization. Nunn and Wong[161] identify that a KM framework is only as effective as its ability to enable and promote knowledge sharing by the members of the organization. Without advocacy, commitment, training, and leadership the KM framework will fail because the people will reject it. Therefore it is critical to engage the members of the organization in a manner that promotes *bottom-up* participation by demonstrating value in their performance of day-to-day responsibilities, which are increasingly complex and require collective engagement, to generate the support required for KM success. Hence, the provision of technologies that support the knowledge sharing and demonstrate value to the individual and the organization by harnessing the *many hands make light work* approach is an important ingredient to advancing the KM capability of the organization.

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[160] Harvard Business Review, *HBR's 10 Must Reads on Change Management* (Boston: Harvard Business Review Press, 2011), 186-193. Although the six steps to effective change from the source where not applied to the KM activities description verbatim, they did influence the author's adaptation of King's definition.

[161] Nunn and Wong, "Knowledge Management for Shared Awareness."

The Future of KM: U.S. Army Doctrine 2015

Currently, the U.S. Army is implementing "Doctrine 2015," which is an initiative to restructure Army knowledge to enhance the creation, collaboration, communication, and incorporation of doctrine at all levels. The new structure consists of four levels of knowledge products that represent an evolving body of professional knowledge pertaining to the conduct of land operations. The first level is comprised of 15 Army Doctrine Publications (ADP) that capture enduring and integrating principles inherent ot land warfare. Each ADP is supported by Army Doctrine Reference Publications (ADRP), which expand on the ADPs to describe the underlying operational concepts. ADRPs are supported by field manuals that detail the warfighting functions and procedures that require standardized definition uniform application to be employed effectively (e.g., all-arms call for fire, medical evacuation). The final level is the rapidly evolving techniques that will be maintained in a military wiki (MilWiki) environment, managed by the CoEs and contributed to by the experts "doing the business," thus being able to rapidly adapt to change and applying the *many hands make light work* truism by harnessing the collective knowledge of the organization directly in lieu of using standing doctrine directorates as proxies. Doctrine 2015 represents a paradigm shift in how the U.S. Army creates and communicates doctrine, leveraging modern technology to decrease development time and increase the participation of the entire organization in evolving the professional body of knowledge codified in doctrine at a pace that ensures relevance to the institution and the people within it.

Source: David G. Perkins and Nathan K. Finney, "Doctrine at the Speed of War…," 34-38.

ORGANIZATIONAL LEARNING IN THE INSTITUTIONAL SPACE

Proposed Knowledge Truism #2

"*Knowledge shared is knowledge doubled"*

The ability of the DND/CAF to meet the demands of the future requires continual and iterative development in the *institutional space*, which forms the body of professional knowledge needed by the organization to achieve tasks and accomplish its mission. Whereas KM in the operating space seeks to achieve immediate effects, organizational learning in the institutional space is focused on analyzing what is known so that it can be incorporated into the professional

body of knowledge in a more deliberate, formal, and authoritative manner. The FSE[162] provides the context for the development of the DND/CAF knowledge, where learning processes are the mechanisms to impart that knowledge on the members of the organization. These processes must be customized, yet complementary, to specific learning objectives, and wherever possible integrated across the knowledge enterprise in order to create a coherent organizational learning framework. To adopt a doctrinal philosophy of the comprehensive approach,[163] the DND/CAF needs to broaden the scope of its learning system so that the development of expertise among both military and civilian members is encouraged, internal and external to the DND/CAF. Only by improving holistic learning objective management and becoming a more inclusive learning organization can the DND/CAF continue to develop, leveraging what is known from the broadest and most comprehensive audience possible. What follows is an illustration of organizational learning approaches and effects that are built around the KM framework and reliant on an individual belief that *knowledge shared is knowledge doubled*, whether or not that knowledge is used by the individual or by the institution to benefit the organization as a whole.

Organizational Learning Approaches

Learning approaches articulate how the organization learns. As described in Chapter 1, the DND/CAF organizational learning approaches are encompassed by the CFPDS,[164] and built onto the KM framework as part of the Integrated Defence Knowledge Model (Figure 3.4).

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[162] Department of National Defence, *The Future Security Environment…*.
[163] Department of National Defence, *Canadian Forces Joint Publication 3.0 Operations*, GL-3
[164] National Defence and the Canadian Armed Forces, "Professional Development," last accessed 27 March 2014 http://www.forces.gc.ca/en/training-prof-dev/index.page

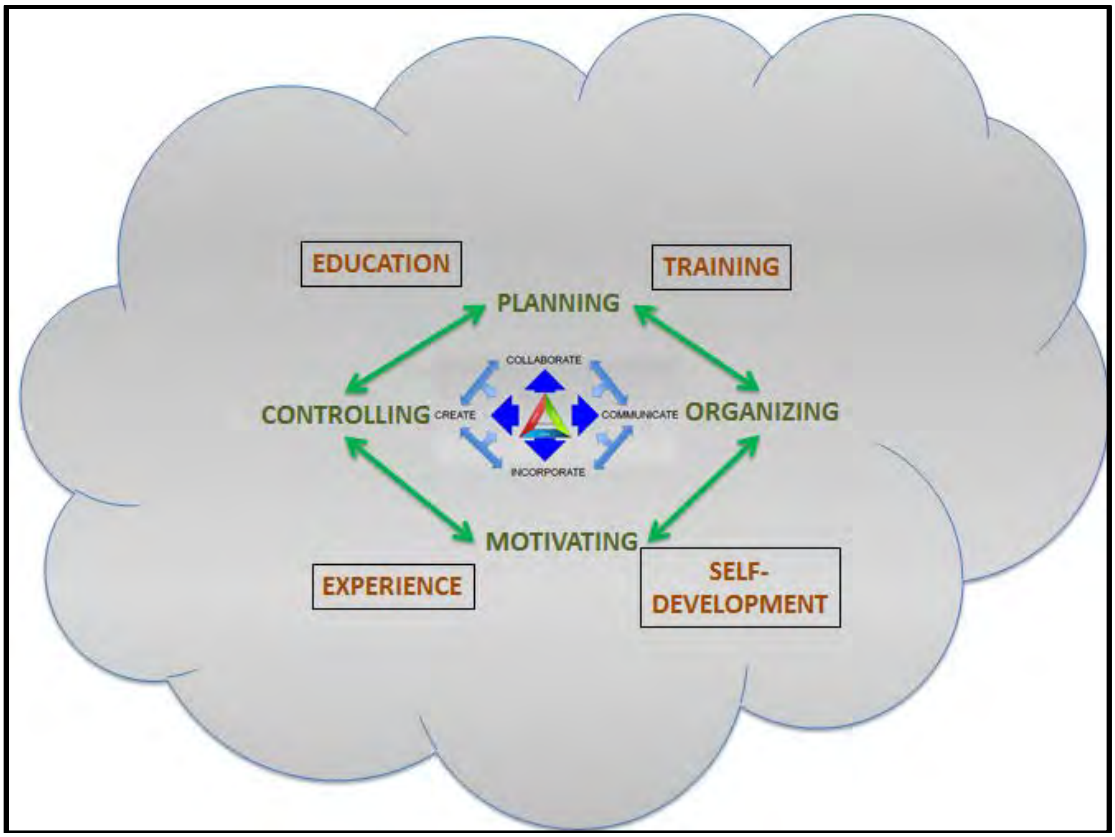

Figure 3.4 – Integrated Defefence Knowledge Model (Organizational Leaning Approaches)

The learning approaches of education, training, experience and self-development should leverage the organizations existing KM framework to achieve effectiveness and efficiency. From an effectiveness perspective, the principles espoused by the *DND/CAF Organizational Learning Strategy*[165] can be applied. By building on the KM framework as an integral element of organizational learning, the processes used in executing tasks and learning to execute tasks can converge to complement each other to promote systemic problem solving and the integration of learning into management practices. This convergence of processes also aids learning from an individual's own experiences, and the experiences of others, as a continuous activity that is

[165] Department of National Defence, *Department of National Defence and Canadian Forces Organizational Learning Strategy*, 5.

directly linked to employment, thus achieving a better learning while doing and doing while learning effect. From an efficiency perspective, processes and technologies that are dual-purposed for both KM and organizational learning help to transfer knowledge quickly through the organization, allow for experimentation with new learning approaches, and optimize the defence investment in knowledge that can support day-to-day operations and institutional learning objectives. Using the same processes and technologies for both day-to-day and learning purposes can also reduce training time on the tools, enhance connectivity of people to each other and people to knowledge, reduce ICT related financial expenditures, and enable an easier transition between operating and institutional learning environments.

Organizational Learning Effects

The goal of learning approaches is to produce learning effects that maintain or improve the way the organization performs tasks and functions. Adapting King's description of organizational learning, which views organizational learning as the goal of KM, learning approaches built on an effective and efficient KM framework serve to continuously improve the organizations practices and behaviours,[166] as illustrated in Figure 3.5.

[166] King, *Knowledge Management and Organizational Learning*, 5.

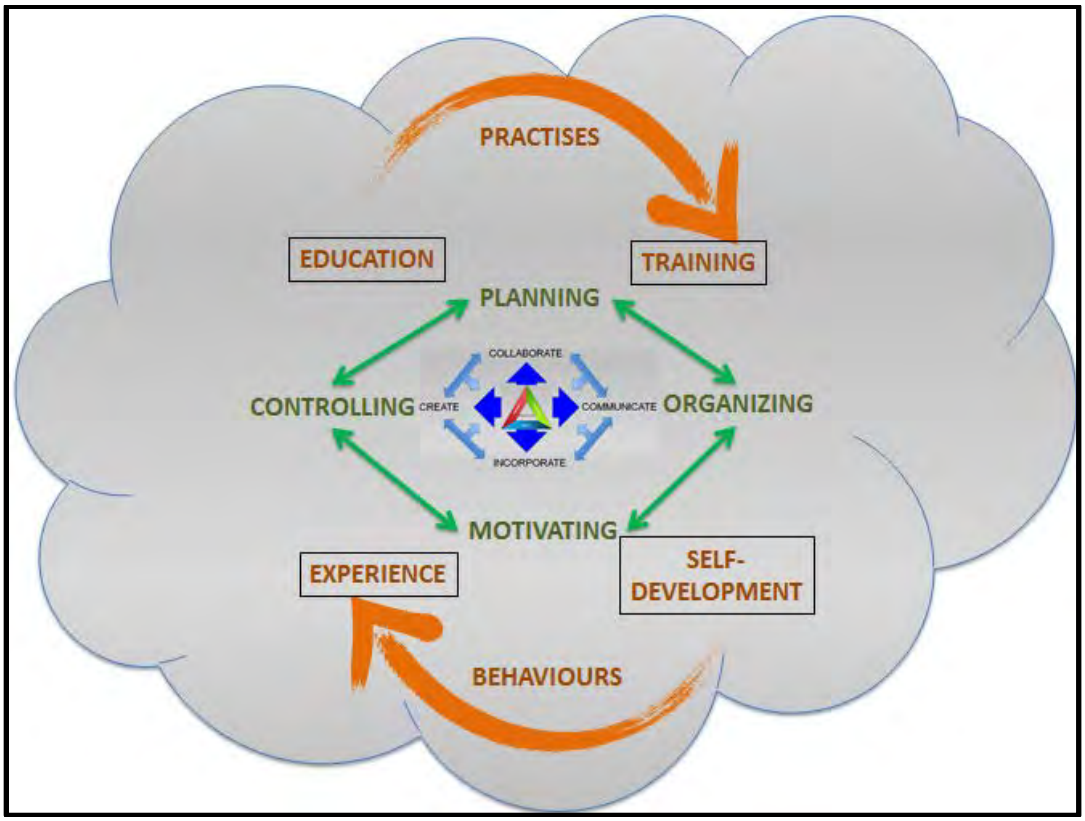

Figure 3.5 – Integrated Defence Knowledge Model (Organizational Learning Effects)

By creating a learning environment that serves the knowledge needs of the individuals and the organization by being responsive and adaptable to those needs, the organization is able to continuously improve. In the context of Senge's five disciplines, explained in Chapter 1, this continuous improvement is marked by the organizations ability to cultivate systems thinking, personal mastery, mental models, a shared vision, and team learning when and where required.[167] As the disciplines are cultivated, the organization will experience changes in *practices* based on the people being capable of performing their tasks in different ways. Changes in practices influence changes in *behaviours* as the members of the organization either see

[167] Senge, *The Fifth Discipline…*, 6-10.

benefit, or not, from being able to do things differently, hence the people are motivated to adopt or resist the changes.

The proposed integrated organizational learning and KM model represents the interdependency of the learning approaches that are supported by KM and the organizational learning effects that can result from, and contribute to, the learning approaches. As identified by Godefroy in the context of lessons learned,[168] the success of learning initiatives are dependent on the ability of the organization to establish sharing processes that promote a more holistic view of the institutional space. An integrated strategy, body of policy, and the support of knowledge institutions within the organization will contribute to converging knowledge processes and technologies to evolve the practices and behaviours of the knowledge community. Executive-level endorsement for organizational learning change is required; however, the ability to realize the change is reliant on *middle-out*[169] knowledge institutions that advise the executive-level and enable the worker-level by steering the development of the organizations knowledge. Hence, integrated knowledge processes that are enforced by the institution and enable knowledge sharing across are critical to organizational learning success and realizing that *knowledge shared is knowledge doubled*.

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[168] Godefroy, "Lessons Learned About Lessons Learned."

[169] If the top of the organization is the executive leadership and the bottom is the subordinate members, then the middle is comprised of the enduring institutional entities that represent the authorities over developing the organizational body of knowledge and expertise. These middle institutions can be specialist directorates (e.g., policy, force development, procurement), education and training establishments, or lessons learned organizations that serve to set the conditions across the enterprise to translate executive vision to subordinate action.

The Future of Organizational Learning: CAF Campus

The CAF is currently embarking on a journey of individual training and education (IT&E) modernization, with the *CAF Campus Operational Framework* as the intended cornerstone of that modernization. CAF Campus is essentially a renewed effort to further exploit the use of virtual learning technologies to allow for increased access of CAF members to continuous, asynchronous, and rapidly evolving learning material to enhance professional development across the organization. Comprised of an enhanced training authority/designated training authority learning support environment (i.e., the institutions, centralized control over common capabilities to reduce redundancy and enhance learning integration (i.e., the virtual campus), and a governance framework to ensure IT&E enables collective training and confirmation, the CAF Campus Operational Framework has the potential to evolve the CAF knowledge processes specific to organizational learning approaches. However, the success or failure of the CAF Campus initiative is contingent on the resources invested, the ability to cultivate participation of both the institutions and the targeted learners who need to adopt the truism that *knowledge shared is knowledge doubled* across the organization, and the harmonization of myriad knowledge process outputs (e.g., lessons learned) to create and maintain the quality of the learning content that will be made available to learners when, where, and how they require/desire.

Source: Department of National Defence, *CAF Campus: Operational Framework*.

KNOWLEDGE TRANSFORMATION IN THE CULTURAL SPACE

Proposed Knowledge Truism #3

"*We know, therefore we are*"

At the core of the Knowledge Space is the *cultural space*, which encompasses the beliefs and biases of the organization towards the value of sharing knowledge as an enabler to KM and organizational learning. The three levels of organizational culture provided by Schein, defined in Chapter 1,[170] characterize the cultural space. In order to affect an organizational change that transcends the community within which the organization belongs, each of the levels of organizational culture need to be shaped to create the conditions where the people will be

[170] Schein, *Organizational Culture and Leadership*, 26.

motivated to accept and adopt the change. Although the DND/CAF has its own unique organizational culture, it is essential to recognize the influence of a broader cultural shift that is inherent to the emergence of the information society. The importance of knowledge, the expectation of being constantly connected with knowledge, and the fundamental desire to share knowledge are becoming the dominant values espoused by the current and future members of the defence knowledge enterprise. If leveraged within a need to share paradigm, these values can contribute to a knowledge transformation of the DND/CAF that will evolve the organization into a more agile, capable, and relevant component of Canadian national power. If limited by the traditional need to know paradigm, these values will create friction at all levels of the organization and potentially inhibit the DND/CAF's ability to accomplish its mission of defending Canada. What follows is a description of knowledge transformation influences that shape the evolution of KM and organizational learning, with a culture of knowledge sharing being the most dominant influence based on the proposed truism that "*we know, therefore we are*."

Knowledge transformation ascribes to the same theory and influences that apply to organizational transformation. The four influences on DND/CAF identified during CF Transformation,[171] highlighted in Chapter 1 and analyzed in Chapter 2, surround KM and organizational learning and complete the Integrated Defence Knowledge Model as depicted at Figure 3.6.

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[171] Jeffery, *Inside Canadian Forces Transformation*…, 15.

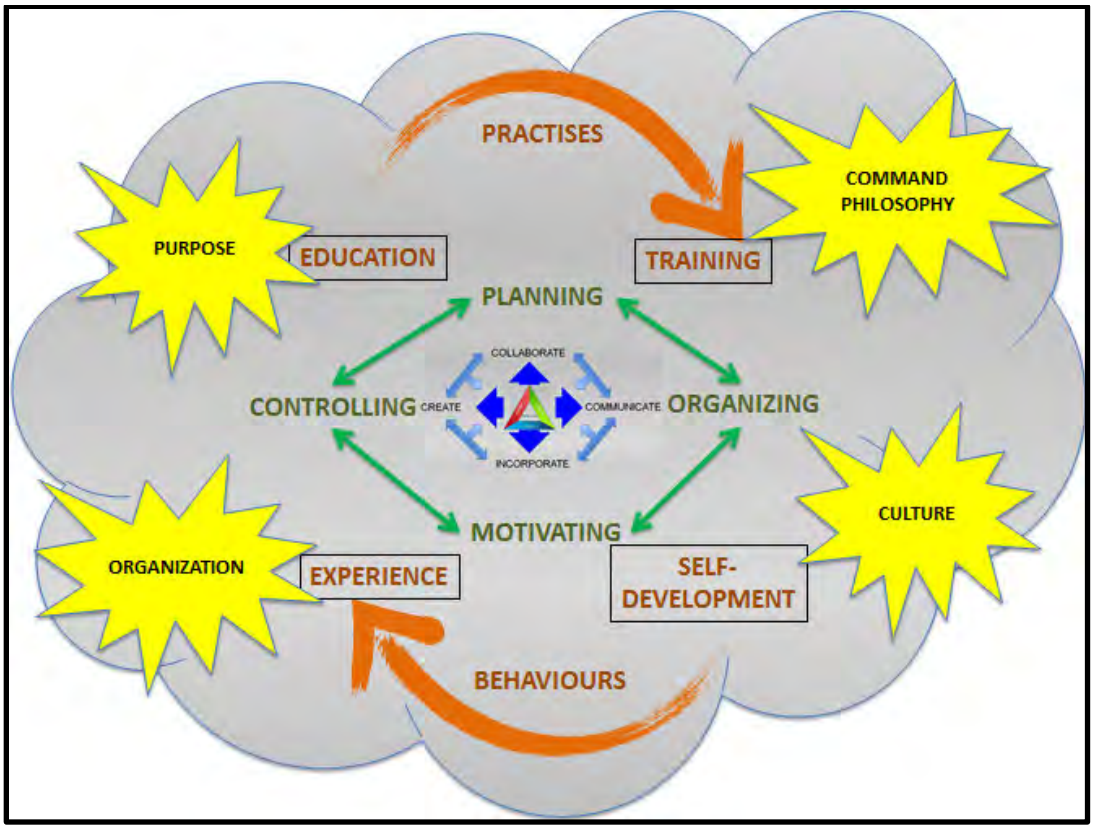

Figure 3.6 – Integrated Defence Knowledge Model

Whereas Jeffrey's analysis of CF Transformation had the organization as the principal element of the change,[172] knowledge transformation has knowledge as the principal element. Knowledge remains central to the Integrated Defence Knowledge Model, as represented by *people*, *processes*, and *products*. Although knowledge itself is an influence on change, the ability to deliberately influence knowledge, is dependent on influencing KM and organizational learning. Hence, changes to *purpose*, *organization*, *command philosophy*, and *culture* serve to influence how organizational learning and KM are shaped to develop and use knowledge by the organization. As identified in Chapter 2, in order to harmonize these change influences it is necessary to communicate the vision, achieve a shared vision amongst the leadership, and create

[172] Ibid.

unity of thought and effort across the organization to affect the change.[173] Given the ability of people, influenced by cultural bias, to resist or even stop change, shaping the cultural influence becomes critical to the success of the knowledge transformation. Essentially, failure to address cultural opposition to a change will undermine efforts invested in introducing a new or revised purpose, adjusting the organization, or adopting a new command philosophy.

Within the proposed integrated defence knowledge model, the importance of recognizing the organizational culture for *what it is* as compared to *what it needs to* be cannot be understated. Today's information society is shifting toward a need to share cultural paradigm, which places the traditional DND/CAF need to know culture at odds. This friction must be recognized by the organization in order to protect information security and defence knowledge imperatives, while enabling the organization to reap the benefits of a more sharing-centric environment. The organization should endeavour to understand the change and subsequently cultivate the need to share cultural paradigm, starting with top-down vision, encouragement, and persistent cultivation of knowledge transformation in the context of the DND/CAF purpose, organization, and command philosophy. Potentially, this cultivation could lead to the DND/CAF becoming the agile an adaptive entity that Alberts and Hayes described as an *edge organization*,[174] particularly with regards to the movement of knowledge outside the regulatory bounds of formal authority and hierarchy, yet still towards the benefit of the organization. If knowledge transformation is approached with executive-level *top-down* commitment, the DND/CAF could be move towards being better positioned to control the change and ensure potential security risks are mitigated,

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[173] Ibid, 55-58.
[174] Alberts and Hayes, *Power to the Edge…*, 165-228.

while exploiting the myriad of opportunities related to organizational learning and KM that contribute to the notion that *we know, therefore we are*.

The Future of Knowledge Transformation: The Next New Reality

As one of his final duties as a serving uniformed member of the DND/CAF, Lieutenant-General Andrew Leslie was appointed Chief of Transformation and given the task of analyzing the CAF and determining the next step for organizational change, summarized in the *Report on Transformation 2011*. Amongst the many observations and recommendations in Leslie's report was a consistent theme of the need to reduce "tail" (i.e., personnel in headquarters and non-operational jobs, inclusive of augmentation from primary reserves on full-time employment, civil servants, and contracted support) to increase "tooth" (i.e., personnel in operational or deployable jobs). Although it remains to be seen what action executive leadership in the DND/CAF will take with regards to the reports observations and recommendations, it is likely in this period of fiscal reductions that finding efficiencies to preserve operational effectiveness will remain a high priority. Hence, fundamental organizational changes, which focuses on rebalancing the human capital of the DND/CAF, could benefit from a knowledge transformation where the truism of *we know, therefore we are* serves to guide the evolution of defence knowledge. Through a top-down vision of the DND/CAF as a transformed knowledge organization, supported by enhancements to the existing KM and organizational learning frameworks, the knowledge-related energy of the organization could be harnessed across the defence knowledge enterprise to create efficiencies, protect effectiveness, and sustain the future relevance of the DND/CAF as an instrument of Canadian national power.

Source: Department of National Defence, *Report on Transformation 2011*.

A VISION OF DEFENCE KNOWLEDGE: ENTER THE "KNOWLEDGE CUBE"

Describing the component parts of a model serves to provide a theoretical foundation, but envisioning how the model could be applied contributes to a practical appreciation and internalization of the knowledge presented. Based on the synthesis of the theory presented in the context of today's defence knowledge environment, the *knowledge cube* is this author's vision of how the DND/CAF could apply the proposed integrated defence knowledge model. The goal of this application of the defence knowledge model would be to enhance the use of information technology, improve the organization's knowledge processes, and shape the organizational

culture to reinforce the shift to the need to share cultural paradigm. This shift would serve as a contributor to organizational success in dealing with complexity, developing to meet the needs of the FSE, and recognizing the influences of the information society.

The knowledge cube represents a way to construct the graphical user interface (GUI)[175] that allows members to better interact with the defence intranet services. Instead of the current desktop configuration of program icons, folders, and "drop-down" menus, the knowledge cube provides a three-dimensional GUI that resembles a Rubik's Cube puzzle toy (Figure 3.7 and 3.8), with each tile representing an application or portal to access information/knowledge resources. The knowledge cube is positioned in the centre of the user's computer display, can be rotated on either the horizontal or vertical axis, and is manipulated using a control device (e.g., keyboard, mouse, or hands-free devices). The applications or portals represented by the tiles consist of: (1) Baseline services commonly used by all members of the organization (e.g., Microsoft Office 2010, DND/CAF orders and regulations, forms and templates); (2) Specialized services tailored to specific users based on their assigned role or function (e.g., operational planning tools, capability development systems, financial management applications); and (3) Customized services determined by the user based on their unique requirements or interests (e.g., graphic design tools, professional knowledge repositories, social networking applications). Each of these applications or portals are categorized and placed on a side of the knowledge cube, representing: the personal knowledge profile (i.e., specific user's virtual presence); a KM function (i.e., create, collaborate, communicate, incorporate); or the applicable organizational knowledge profile (i.e., organizational learning resources).

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[175] *The Linux Information Project*, s.v. "Graphical User Interface," http://www.linfo.org/gui.html

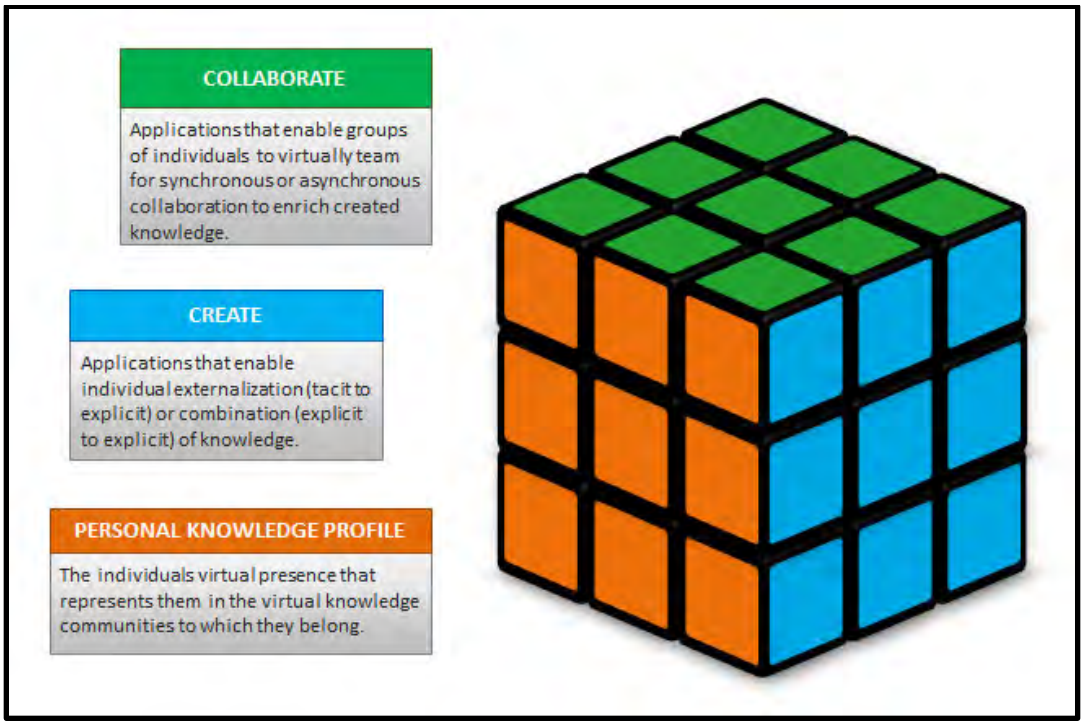

Figure 3.7 – Knowledge Cube (Part 1)

The *personal knowledge profile* is the virtual presence of each member of the organization. With functionality similar to immensely popular social networking sites, such as Facebook and LinkedIn, it is a web-based tool that serves as both a representation of the individual and a means to connect across the defence knowledge enterprise (i.e., internal and external to defence). It should identify who the person is, where they are employed, what they are doing, where their interests are, as well as allow for posting updates. It could serve as both a resume of experience and a means to connect to "colleagues," professional contacts within the organization, and CoPs that transcend their organization.[176] It should be structured to include common fields such as name, rank, position, education, training qualifications, and honours or

[176] Clerk of the Privy Council, "What We've Heard: Blueprint 2020 Summary Interim Progress Report," last accessed 2 April 2014. http://www.clerk.gc.ca/eng/feature.asp?pageId=362 . This progress report explains GCconnex, a Government of Canada social networking platform, and how it is improving the development of connections across the Public Service. Ideally, the personal knowledge profile would be integrated with, or hosted on, GCconnex to broaden DND/CAF connectedness with the rest of the Government of Canada.

awards that identify the individual user, as well as be flexible enough to allow for sharing observations, insights, best practices, opinions, and questions that serve to enhance the participative nature of the knowledge network. Essentially, the military is a social organization and knowledge sharing is a social activity, so the personal knowledge profile provides a virtual social interaction platform that would contribute to the community aspect of the DND/CAF and partner organizations (e.g., other government departments, allies, industry).

The *create* side of the knowledge cube is comprised of the tools and applications that allow the user to convert and codify knowledge by creating knowledge artifacts that can be shared or added to the professional body of knowledge. Tacit to explicit knowledge externalization would be supported by virtual tools such as word processors (e.g., Microsoft Word), presentation programs (e.g., Microsoft PowerPoint), as well as digital audio and/or visual recording applications (e.g., voice logs, digital photography, video). These same virtual tools can enable explicit to explicit knowledge combination through inherent cut-and-paste functionality, or more specialized digital editing applications. All of these tools and applications should be complemented with training (i.e., live or virtual), delivered just-in-time based on position or as part of common, occupational, and/or specialist training within the DND/CAF. Further, each tool or application would have integral user guides that assist the user with functionality, as well as examples of how best to articulate knowledge by providing context, reflection, and links to the originators personal knowledge profile. This part of the cube captures individual knowledge in a structured manner so that it can be shared through the technology using automated processes and tools.

The *collaborate* side of the knowledge cube provides the means to virtually team with groups of individuals, either synchronously or asynchronously, to collectively create or enrich knowledge. Whereas the create tools are limited to tacit to explicit or explicit to explicit knowledge conversion, through collaboration both explicit and tacit knowledge can be created as interaction occurs between people and technology, as well as people with people through technology. Video or web conferencing, live digital workspaces, and virtual chat rooms allow individuals to collaborate in real-time, while blogs, virtual discussion boards, and wikis enable asynchronous collaboration. These services could be extended beyond the DND/CAF or GoC intranets through proxy servers by opening "tunnels" through exiting firewalls, thus enabling collaboration among a more comprehensive audience of partners.[177] Virtually collaborating harnesses the knowledge of groups to produce specific outputs, innovate by coming up with new ideas, or discover new knowledge generated by sharing different experiences brought together to solve common issues.

[177] Currently in place with GCconnex.

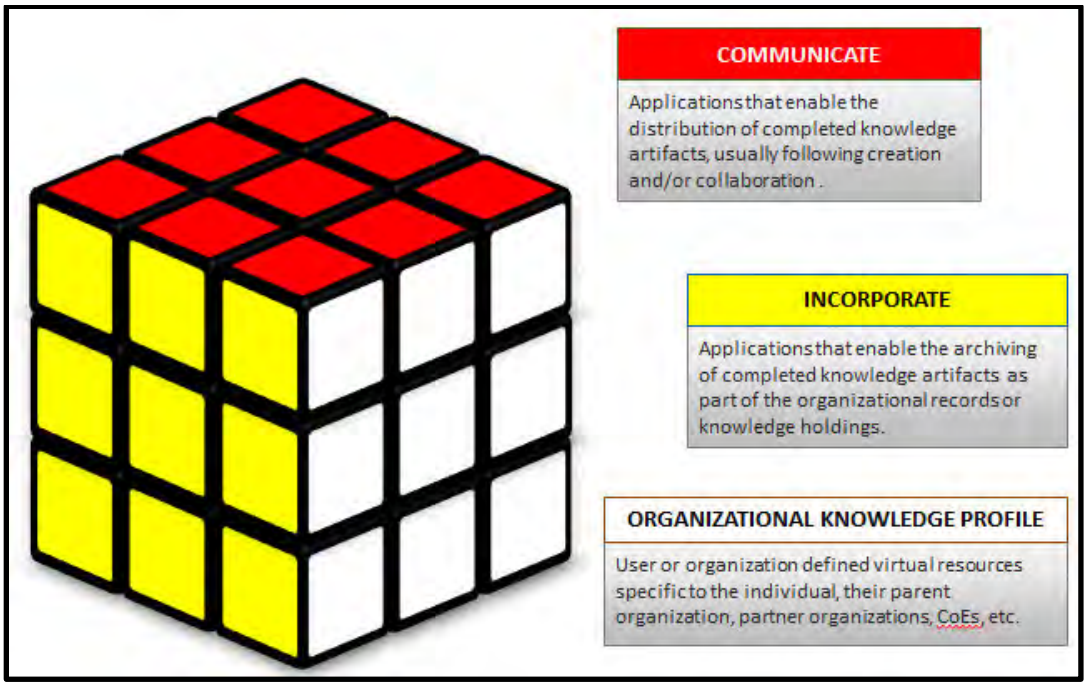

Figure 3.8 – Knowledge Cube Part 2

The *communicate* side of the cube is inclusive of the different services that support the users ability to share knowledge on behalf of, or as an agent in, the organization. Whereas the personal knowledge profile encompasses knowledge that is directly attributable to the individual (i.e., personalized), the communicate function would represent a more formal or authoritative release of knowledge that is attributable to a position or component of the organization (e.g., an operations officer in a joint task force headquarters, a requirements directorate in an environmental command headquarters). This differentiation in attribution could contribute to the cultivation of the individuality of the members of the organization (i.e., everyone has a unique voice), while continuing to emphasize the team aspects inherent to the military hierarchy (i.e., everyone has a part to play). Knowledge could be communicated in using a variety of digital mediums, such as virtual chat services, Outlook email, file share repositories (e.g., local share drives, "cloud-based" file shares similar to Dropbox or Google Drive), and internet/intranet web sites. Use of these services should be under role-based accounts to ensure that as the people in

positions change, the ability to make inquiries pertaining to authoritative knowledge shared to the responsible agency is preserved, with the person in the position or people in the component able to reach out to previous incumbents, if and when required through the personal knowledge profile.

The *incorporate* side of the knowledge cube provides the tools and services that archive explicit knowledge artifacts into the organization's professional body of knowledge. Partially described under the current policy on recordkeeping, articulated in DAOD 6001-1, incorporation of knowledge is focused on the capture and storage of knowledge artifacts in a manner that allows for subsequent retrieval and use by the organization, when and where required. The tools on the incorporate side of the cube focus on supporting the user's ability to format, tag with metadata, and categorize explicit knowledge so that it is retrievable using search functionality inherent to the system. Attribution of knowledge artifacts to originator positions and individuals is important to provide context, as well as the ability to develop a particular knowledge artifact for use in a different time, space, or purpose. Hence, the incorporated knowledge is more than just a repository of files; it is a curated registry that enables people to connect with both explicit and tacit knowledge resources across the defence knowledge enterprise.

The *organizational knowledge profile* represents the knowledge resources, available from the professional body of knowledge, that are managed by the institution and can be customized to the specific user based on position or role, area of technical expertise, and interests. Examples include policy, doctrine, training manuals, specialized tools or applications, and templates of processes and products used to perform functions (e.g., the operational planning process, a

decision support matrix). Organizational knowledge should be managed through officially appointed CoEs who act as the conduit to collect, analyze, and articulate knowledge specific to a particular discipline or area of expertise gained from lessons learned and best practices. The user's organizational knowledge profile would connect them to the knowledge resources offered by CoEs, as well as afford the user the opportunity to amend the resources based on the particular context in which they are using them. Amended knowledge resources (e.g., revised checklist, new procedure, proposed amendments to doctrine) could be published back to the organizational knowledge profile as unofficial entries for others to access, review, comment, critique, and use prior to being analyzed by the applicable CoE as part of an official knowledge resource development process.

This vision of the knowledge cube and how the defence knowledge enterprise could be presented to the common user while supporting the entire organization may be just an idea today, but it is entirely possible to achieve within the current technology, processes, and people available to the DND/CAF. For example, SharePoint 2010 provides a platform that provides or supports the integration of many of the functionalities identified within the knowledge cube idea, but it would need to be developed against a clearly defined comprehensive KM framework that enables users and contributes to the exchange of knowledge associated with organizational learning in the institutional space. If the DND/CAF can form the right knowledge vision, reliant on the promotion of sharing, it will be able to develop the understanding, commitment and support required to affect a fundamental defence knowledge transformation where the members of the organization and the organization as a whole can enhance its use of knowledge to achieve success.

SUMMARY

The intent of this chapter was to synthesize the theory and analysis provided in Chapters 1 and 2 in order to illustrate the importance of the need to share cultural paradigm and re-conceptualize the defence knowledge enterprise. The proposed knowledge space provides a model that links the operating and institutional facets of knowledge, built on the underlying influence of culture as the core determinant of the organization's desire to change. Within the operating space, KM functions and activities that describe how the organization's knowledge products could be managed and applied to day-to-day complexity, with emphasis on the role of technology as a key enabler, were described. Organizational learning approaches and effects where built onto the KM framework as the means of developing the organization's knowledge within the context of the FSE by integrating processes in the institutional space. Knowledge transformation, as a fundamental change to the organization's foundation, highlighted the influences on organizational learning and KM with organizational culture being the key determinant of transformational success or failure. Finally, the knowledge cube illustrates how existing technology could be used to support knowledge processes with a view to demonstrating the potential value of knowledge sharing, which could aid in shaping the DND/CAF organizational culture to enhance the defence knowledge enterprise.

CONCLUSION

All models are wrong, but some are useful.

-George E.P. Box, *Empirical Model-Building and Response Surfaces*[178]

The overarching theme under which complexity, the FSE, and social change reside is one of humans influencing and being influenced by their environment, which in turn influences the development of culture. Much like the growth of a pre-industrial or agrarian society is reliant on the production and sharing of food, and industrial society gains strength from the development of more industry, an information society needs to increase its aggregate knowledge to expand its human capacity in order to remain viable and retain a competitive edge. To do this, an information society and its organizations must enable knowledge workers to overcome the stresses of accelerated change and avoid the shock of perceived transience, while dealing with the complex reality that surrounds them. The critical goal is to remain focused on the intellectual endeavours associated with improving knowledge of the environment and sustaining creative thought, innovation, and development of the collective. Therefore, effective KM and organizational learning built on a culture of need to share amongst existing members and across generations are essential ingredients for organizational success within a complex environment, the FSE, and the information society.

KM provides the *means* to share knowledge by creating *connections* across the defence knowledge enterprise that enables the organization to harness the human capital to collaboratively solve complex problems. These connections are reliant on the *individuals* in the

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[178] George E.P. Box and Norman Richard Draper, *Empirical Model-Building and Response Surfaces* (New York: Wiley, 1987), 424.

organization seeing *value in the technology* by making it easier for the common user to participate in knowledge sharing, complete tasks and contribute to mission success. Cultivating the realization of value requires overcoming the barriers inherent to a culture that views defence technology as ineffective and inefficient as compared to the digital tools available in their personal lives that are more intuitive, enticing, and engaging. Timely *education and training* on the KM framework and tools is the key to cultivating this new culture from the *bottom-up*, which in turn will contribute toward achieving the benefits of collective efforts or *many hands making light work*.

Organizational learning encompasses the *methods* that enable *knowledge flow* by integrating processes used by the defence knowledge enterprise to develop the organization to remain responsive to the evolving demands of the FSE. This flow must be facilitated and managed by the *institutions* to ensure *value in the processes* by harmonizing the efforts of groups to share knowledge gained from lessons learned and add to the comprehensive professional body of knowledge of the organization. Fostering an appreciation of the benefits of integration is contingent on breaking down a culture of knowledge silos by demonstrating the common needs across the organization while being responsive to the unique aspects associated with military and civilian, environmental services, and specialty functions within the defence knowledge enterprise. Appropriate *policy*, *centralized authorities*, and *common venues that create dialogue* amongst stakeholders who develop the organizational learning framework are essential elements of growing this culture from the *middle out*, which will promote embracing the tenet of *knowledge shared is knowledge doubled*.

Knowledge transformation creates the *motivations* to share knowledge by influencing the *beliefs and values* of the people who comprise the defence knowledge enterprise and are increasingly representative of cultural biases derived from an emerging information society. Recognizing these beliefs and values is critical for *executive-level leadership* who must communicate the *value of change* by articulating vision, providing strategy, assigning resources, and sharing knowledge that shapes the organization towards the desired end state. Transitioning from the traditional hierarchical to the new networked approaches of sharing knowledge requires adoption of a need to share cultural paradigm that respects need to know imperatives associated with information security and knowledge integrity. Understanding the *influences* on change, *encouraging participation*, and *identifying cultural biases to overcome or leverage* in the pursuit of fundamental transformation are the keys to a successful change initiative that is directed *top down*, with recognition that as an organization *we know, therefore we are*.

Models provide value in conceptualizing reality, which contributes to an organizations ability to identify gaps and opportunities to enhance performance, sustain development, and affect fundamental change. The models presented in this paper represent a re-conceptualization of the defence knowledge enterprise that describes the *knowledge space*, as well as the interdependent relationships that exists between KM, organizational learning, and knowledge transformation. The resulting *Integrated Defence Knowledge Model* provides a tool that the DND/CAF can use to assess the effectiveness and efficiency of the current defence knowledge programme, as well as plan improvements in how the organization uses, develops, and changes knowledge in the future. Further, the *KnowledgeCube* illustrates how knowledge products can support learning processes to enable people, who represent the human capital of the organization,

to better perform the functions and responsibilities required to achieve success in assigned missions and tasks. However, it must be understood that knowledge models and frameworks achieve nothing without the right culture, which as this paper contends, needs to transition from *need to know* to an adoption of *need to share* in order for the DND/CAF to remain relevant in the FSE.

This paper has focused on the *why* and *what* of defence knowledge change, using a sampling of theory and analysis to provide a synthesis of select knowledge into propositions that reinforce knowledge concepts, highlight gaps and opportunities in knowledge frameworks, and provide alternatives for viewing the defence knowledge enterprise reality. Future research should focus on continuing to characterize the emerging changes to Canadian society, that influence the people that make-up the organizations within that society, in order to identify new cultural biases related to knowledge and gauge how those biases can or should be shaped within an organizational context. Also, the DND/CAF should remain engaged with allied and partner militaries, analyzing why and how knowledge-related change is happening in order to garner lessons learned applicable to the Canadian defence knowledge enterprise and ensure future knowledge development does not cause the organization to diverge to the point that interoperability and common understanding in the FSE is jeopardized. Finally, research pertaining to knowledge-related change management, inclusive of vision and strategy development, communication, influence, and measuring effects, is crucial to contributing to the DND/CAF professional body of knowledge that sets the conditions for success or failure of the organization in a complex, rapidly evolving, and constantly adapting defence knowledge enterprise.

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