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The Australian Army in the 21st century: organisational adaptation to new conditions of military engagement – a complex adaptive system perspective

For the award of Doctor of Philosophy

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To my mother, Alfiya Galiaskarova, for her endless love, faith and support

Посвящается моей маме, Галиаскаровой Альфие Агзамовне, за ее бесконечную *л*юбовь, веру и поддержку

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Abstract

Modern military engagements are characterised by complexity, dynamics and unpredictability that force armies as complex social bureaucratic systems to adapt to continuously changing conditions of war. This is an on-going vital matter since modern society has been under stress from recent military engagements in Afghanistan, Iraq, Syria as well as current terrorist attacks in France and Belgium. We are seeking a way to describe and understand from a theoretical perspective both the operational conditions and the process of adaptation that the Australian Army needs to employ in response to external changes of these extreme kinds. In this regard Complex Adaptive System (CAS) theory offers an advanced method of understanding contemporary warfare and military organisations that will represent the core focus of the thesis; its main goal being to appraise organisational change in the Australian Army through the lens of CAS theory.

The literature review on this topic identifies changes in contemporary warfare and characterises both modern military engagements and organisations as complex adaptive systems. Any army representing the defence of a nation state strives to be both capable and effective in its military engagements, most notably in conditions of war or hostilities against a known enemy combatant. The objectives of capability and effectiveness, often understood as *'fit for purpose'*, means that an army must always be in a state of readiness to change, not only to keep abreast of the methods and tools of warfare technology that continuously evolve but ideally to be strategically ahead of the enemy, whether in a classical battleground scenario or, as seems more likely, fighting an opponent who has the advantage of local knowledge, an element of surprise and other features of asymmetrical warfare providing them with the upper hand. Contemporary warfare, as

described in the history books, has already moved beyond our capacity to understand and interpret the nature of conflict. Moreover, the lessons of military engagement for the Australian Army in recent years fighting insurgency in faraway lands point to a new level of complexity where unforeseen and unknown factors play a decisive part in determining success and failure in strategic planning and actual operations. Difficult though it may be, the Army has no choice but to embrace new *'out of the box'* thinking and get to grips with the mysteries of CAS in order to adapt and remain effective. This leads us to the main research question that is:

How does a modern professional army adapt, structurally and functionally, to the changing nature of military engagement, which is increasingly characterised by complexities arising outside of conventional operations?

CAS theory can be seen as a promising perspective in appraising these complexities as it provides a number of characteristics that offer a better understanding of the nature of modern warfare and military organisations. To apply CAS theory to a real-life case of organisational change we have chosen the Conceptual Framework for Adaptation (CFA) since it provides a good descriptive model of CAS. Moreover, CFA, currently being developed by the Defence Science and Technology Group (DST Group) in Australia, is the most familiar framework for the Australian Army in the task of reviewing the complexities of both modern warfare and military organisations. For this reason, the thesis uses CFA as a methodological basis for appraising a case of organisational change. The findings will draw on ideas taken from CAS theory and CFA as a means to appraise organisational change.

From a practical point of view, we have selected a recent case of organisational change that had been introduced into the Australian Army. In particular, in response to future environment complexities, the Australian

Army has released *Adaptive Campaigning* and launched the Adaptive Army Initiative (AAI). This is an ambitious program that puts the whole organisation on an adaptive footing, claiming to be a restructuring of higher command and control arrangements by providing a systemic approach to adaptation across the entire Army. The review of the AAI aims to explore from a theoretical perspective, how the Army as a complex organisation, and given its multiple functions, levels of command and control, can actively manage this adaptation to a continuously changing environment. During the AAI review we conducted 19 face-to-face interviews that included 13 senior Officers, 3 mid-ranking Army Officers and 3 external to the Army people. We also recognise that organisational learning plays a crucial role in the way the Army adapts to external requirements. To cover this ground we conducted a review of the lessons mechanisms, Army Lessons Network (ALN); the focus being on the operational aspects (process, structures and roles) that make an organisation adaptable to changing conditions. Thus, the thesis describes how the change was designed and implemented as well as the outcomes that have been possible to track so far. Appraisal of the lessons processes in the Army, through the ALN review, helps us to understand the role of organisational learning as a mechanism of change. Both the AAI and ALN analyses demonstrate that the Army has developed characteristics of CAS.

Taking into account the views of experienced senior Army Officers about their own self-generated initiative to drive and foster an adaptive, change-oriented culture, the thesis demonstrates the depth of understanding of the challenge of achieving *'fit for purpose'* organisational performance as well as the important contribution of leadership, a supportive socio-culture and the lubrication of organisational learning. This is what the thesis has revealed and its special knowledge contribution is to obtain the insights from Army

leaders as practitioners about what is going on in a modern army in a continuous process of transition. Indeed, gaining access to the thoughts of these truly professional soldiers has provided the thesis with unique and original insights into military operations.

The thesis explores the development of a model of the Army as a complex adaptive system. It acknowledges that in the context of the practical orientation of the Army theory-building this is just the beginning of a long road-testing process. A serious attempt has been made to start the theory-to-practice process with an extensive exploration of leading ideas inspired and drawn from complex system thinking.

Key words: complex adaptive systems (CAS), organisational change, organisational learning, organisational adaptation, Australian Army, Conceptual Framework for Adaptation (CFA), irregular warfare

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Abbreviations

AAI	Adaptive Army Initiative
ABCA Program	American, British, Canadian, Australian and New Zealand Armies' Program
ACMS	Army Capability Management System
ADF	Australian Defence Forces
ADO	Australian Defence Organisation
AIF	Australian Imperial Force
ALE	Army Learning Environment
ALIAS	Army Lessons and Insights Analysis System
ALN	Army Lessons Network
ALO	Army learning organisation
ANAO	Australian National Audit Office
ANZAC	Australian and New Zealand Army Corps
Army HQ	Army Headquarters
ASDA	Act – Sense – Decide – Adapt
ATC	Army Training Continuum
AWB	Adaptive Warfare Branch
BRIG	Brigadier
C2	Command and control
CA	Chief of Army
CAL	Centre for Amy Lessons
CAS	Complex Adaptive System
CDG	Capability Development Group
CFA	Conceptual Framework for Adaptation
COL	Colonel

CT	Complexity Theory
DG PERS	Director-General Personnel—Army
DGSP-A	Director General Strategic Planning – Army
DI(A)	Defence Instructions – Army
DMO	Defence Materiel Organisation
DST Group	Defence Science and Technology Group
ELF	Enhanced Land Force
FIC	Fundamental Inputs to Capability
FORGEN	Force Generation
GFC	Global Financial Crisis
HMSP-A	Head of Modernisation and Strategic Planning - Army
HNA	Hardened and Networked Army
HQ FROCOMD	Headquarters Forces Command
HQ JOC	Headquarters Joint Operations
ILL	Immediate learning loop
LCBB	Land Capability Battle-worthiness Board
LLL	Long learning loop
LTCOL	Lieutenant Colonel
LTGEN	Lieutenant General
MAJGEN	Major General
MLL	Medium learning loop
NCW	Network Centric Warfare
OODA	Observe – Orient – Decide – Act
SCS	Soldier combat system
SLL	Short learning loop
STS	Sociotechnical systems

SWOT	Strengths – Weaknesses – Opportunities – Threats
TOR	Terms of Reference
TOWS	Threats – Opportunities – Weaknesses – Strengths
AIF	Australian Imperial Force

Chapter 1
The need for adaptation

1.1. Preface

Curiosity instigated the origins of the thesis. Growing up in Kazakhstan my first vocational ambition was to become an army Officer. The dream expired. Instead in my later teenage years I went to Moscow to study at a top technology university, Bauman Moscow State Technical University (BMSTU), in aerospace systems engineering. Since I was both fascinated and curious about how complex systems worked, I applied this interest to my studies in rocket launch engineering problems and solutions. Having a degree in this field led me to work on new complex projects in the Boeing and General Electric companies where I applied my knowledge to new airplane and locomotive development. Years later, living in Australia and doing a Master degree in Applied Project Management, I expanded on my long-term interest in complex systems. By Complex Systems I mean those systems that are characterised by high levels of uncertainty, ambiguity and unpredictability while generally defying the logic of linear and reductionist thinking. Complex systems of any kind require a different mind-set to comprehend and manage them effectively, or at least they need an alternative method of 'thinking outside the box' that allows them to approach problems in a different way.

Faced with the challenge of doing PhD research in the open field of complex systems I resorted to my childhood imagination and decided that a modern day army (in this thesis the single case of the Australian Army) represented a complex organisation that had to function as a whole system, especially if it

was to be effective in times of conflict and warfare. The nature of warfare has changed and today a modern army is challenged by asymmetrical forms of military engagement. For the Australian Army this experience started in Vietnam, was reinforced in Timor and came to full realisation in Afghanistan and Iraq. The key point is that a complex organisational system as represented by a modern army must adapt and change to new and complex forms of engagement. My curiosity was focussed on how such a complex organisational system as the Australian Army could adapt and change to meet the challenges of today.

In doing background reading on my stated interest, but without a clear 'road-map' to navigate by, I came across an academic paper, written about the abstractions of theory-building and systems modelling by Dr Anne-Marie Grisogono (former research group leader in Defence Science and Technology Group, or DST Group). I was deeply attracted to the contents of the paper and set my course on understanding a modern army as a complex adaptive system and how the process works in practice. I made contact with the author and an immediate personal connection was formed, which led to the DST Group and a team of researchers working various projects on all aspects of army organisation and system functioning. I was invited into the fold and so began a long journey into the subject-matter of the thesis. It is a great testament to the open spirit of Australians that I was encouraged to develop my research interest with their active support.

1.2. Introduction

The thesis begins with some general observations and thematic questions about the nature of a modern and professional army in changing times, in

this case the Australian Army[1]. The rest of the introduction will elaborate and refine this general overview. The next few paragraphs are like picking up a road map and getting an initial orientation.

Any army representing the defence of a nation state strives to be both capable and effective in its military engagement, most notably in the conditions of war and hostilities against a known enemy combatant. The objectives of capability and effectiveness, often understood as *'fit for purpose'*, means that an army must always be in a state of readiness to change, not only to keep abreast of the methods and tools of warfare technology that continuously evolve, but ideally to be in strategic advance of the enemy, whether in a classical battleground scenario or, as seems more likely, fighting an opponent who has the advantage of local knowledge, an element of surprise and other features of asymmetrical warfare.

In contemporary times, war, as it is known in the history books, is changing ahead of our capacity to understand and interpret the nature of conflict. Moreover, the lessons of past years of military engagement for the Australian Army fighting insurgencies in faraway lands point to a new level of complexity where unknown and unforeseen factors play a decisive part in determining the success or failure – both in the strategic planning and its actual operations. As difficult as it is, the Army has no choice but to embrace new *'out of the box'* thinking and get to grips with the mysteries of complex systems thinking in order to adapt and remain effective. A modern army has to seek continuous improvement through regular and systemic organisational adaptation. This means thinking ahead and constructing new methods of military engagement.

[1] Below we use two names, the Australian Army and the Army, referring to the same organisation.

An army is a complex organisation. Complexity has several meanings. An army comprises many inter-locking parts that can be arranged vertically in an authority and command structure, as well as horizontally across a range of specialist role and functions, such as infantry, engineers, supply chain and clerical staff, to name just a few of the complex division of labour in any military organisation. This combination of structure and function poses challenges at all levels of communication, added to which is the need for the disciplined behaviour of its human resources. An army is always faced with the problem of dysfunction since such organisational alignments are invariably complex having so many moving parts to co-ordinate effectively if they are to achieve their required objectives.

On the one hand a modern army has to be agile and quick to respond to the changing nature of warfare and military engagement. This is where a professional army has the edge over one comprising of drafted recruits as it can train and prepare for what it has to do on a continuous basis. In this sense a modern professional army represents an ideal-type of organisational learning constantly acquiring knowledge and skills, particularly in the application of ever-evolving tools in the field of military technology and hardware. In brief, a modern army is paradoxical. It has to be responsive to threat and requires a flexible organisation to act decisively. At the same time an army is a complex bureaucracy, about as difficult to manoeuvre as a large oil tanker.

The most significant form of complexity stems from its relationship to the external environment. This becomes clear in dealing with emergent forms of combat and warfare, notably experienced with allies from the western world engaged in various kinds of insurgency, typically driven by religious extremism. This is increasingly looking like a war without an end, since no political solution is either being considered or is even attainable. Complexity

in this sense means dealing with an enemy with the advantage of local knowledge, a fanatical non-negotiable religious ideology unconventional methods of warfare and the critical element of surprise; a scenario where the unforeseen and the unpredictable play a decisive part in determining the nature of military engagement, forcing a conventional army onto the defensive. Such a high level of uncertainty makes it difficult to calculate risk and planning strategies. The question of military capability under conditions of such extreme uncertainty creates a form of intellectual complexity, requiring other ways and means than those normally used in strategic thinking and planning.

Thus a broad question arises: how does a modern army, faced with organisational complexity caused by new forms of combat and warfare, adapt to such a changing external environment? What must it do, in the sense of having a vision and strategy of change, to successfully adapt at an operational level to a new or different form of transformational organisational capability in order to anticipate and engage with these challenges? What part does leadership play in making the system work in this far-reaching way? Is organisational learning the key lubricant for managing organisational change? How does it align itself with what the leadership commands? How are results to be understood? These and other questions, suitably converted into the language of academic research, appear later in this introduction, and throughout the thesis as the findings are analysed and interpreted.

1.3. Brief historical overview of the Australian Army

On the 25th April 2015, Australia celebrated 100 years since the members of the Australian Imperial Force (AIF) landed on Gallipoli with troops from New Zealand, Britain, and France (*First World War 1914–18* 1980). This was

one of the main actions associated with the beginning of Australia's involvement in the First World War. Since 1945 Australian *"armed forces have fought in seven wars … and never in response to a direct threat to its sovereignty"* (Dapin 2011, p. xi). Operations involving the Australian Army were perceived as ones of protecting national interest while being conducted offshore. The Army's warfare experience of the two world wars is linked to the desert, jungles and islands terrains rather than with the trench warfare that was conducted in Europe (Blaxland 2013, p. 2). Advance in military experience obtained in Namibia, Cambodia, Somalia, Rwanda and other places allowed the Australian Army to successfully lead operations in East Timor and Solomon Islands and gave it a reputation as *"a politically neutral and emblematic national institution"* (Blaxland 2013, p. 7).

A significant part of the history of the Australian Army is linked with its participation in the world wars. However, global events in recent decades have involved the Australian Army in non-traditional operations and shifted a general understanding of global security and warfare. These new conditions of war also demonstrated a need for adaptation as well as revealing the need for an increased speed of deployment and broader types of operations to cope with humanitarian, peacekeeping and natural disasters.

Looking at the Australian Army it is possible to see its obvious success in conducting its main business – defending the nation and fighting wars. Seven wars since 1945, including recent operations in Iraq and Afghanistan, have not in any way detracted from its reputation, on the contrary, the Australian Army has shown a genuine ability to adapt and enhance its reputation in any form of military engagement. Moreover, over less than one hundred years the Australian Army has managed to reorganise itself from a small infantry-centric land force into a world-class military organisation with a strong international reputation. Starting from limited self-supporting

capabilities the Australian Army has mastered varying types of operations (including counter-insurgencies, disaster relief and peacekeeping) as a part of a bigger joint entity both within the Australian Defence Forces (ADF) and in cooperation with its international allies. The Army now is a professional military organisation with a strong emphasis on individual and collective training which efficiently works with its traditional and regional allies; it is an organisation that has a very strong support and admiration among Australian citizens and offers wisely thought out services in order to maintain global security and to help those who are in need.

With clear evidence of such positive results, the Australian Army provides an interesting case for this type of research study, holding as it does a promise that can highlight the main aspects of successful organisational adaptation.

1.4. Continuous need for adaptation

"military organisations inevitable get the next war wrong mostly for reasons lie beyond their control" Michael Howard[2]

One of the most important statements that open our discussion about the continuous adaptation in war is the fact that war itself is a complex phenomenon in its very nature (Murray, Williamson 2011b, p. 31). It is highly unlikely to precisely predict its course; it is also very dependent on many factors. Williamson & Murray account for the difficulties of military adaptation to the complexity and ambiguity of war for a variety of reasons, such as: high physical and physiological pressure placed on its military personnel that lead to difficulties and issues of decision making process (at all levels, i.e. in a battlefield or in a room of strategic decision makers). This

[2] Original reference in "Military Adaptation in War: With Fear of Change" (Murray, Williamson 2011a).

includes the ability of human beings to correctly predict future outcomes, to acknowledge the difference between predictions and reality as well as to adjust their behaviour to eliminate that difference; the limitations that military bureaucracy puts on its organisation; the competence of military personnel including issues of 'cult of personality' that may affect the direction of necessary adaptation and change; and finally, tactical, operational and strategic levels of adaptation that are required to achieve victory (Murray, Williamson 2009). A combination of these factors makes the process of organisational (military) adaptation very complex. An interesting fact here is that in the midst of all factors mentioned above is one constant factor, namely that human beings are involved, a fact that can significantly influence the flow of war and the success of organisational adaptation. Having stated the factors that complicate organisational adaptation in war, it is necessary to note that this adaptation of a military organisation is a crucial and inalienable aspect that every army, navy or air force should demonstrate to be effective and fulfil its 'fit for purpose'. It is almost impossible in the military world to fail to adapt, since failure ultimately leads to death or defeat.

While war is complex by its nature, it is still possible to divide the history of war in two periods of time. The difference between these two periods lies in the required pace of adaptation. The first period relates to the time before the Industrial Revolution in the nineteenth century, where the speed of adaptation was at a snail's pace (Murray, Williamson 2011b, p. 31). Before the time when new technologies provided by the Industrial Revolution influenced warfare conditions, success of military operations were highly dependent on the technical level of the armed forces involved in the conflict and the ability of their leaders to manage these capabilities. A win at battle almost always meant a resolution of the conflict and the dominance of the

victor. Armies with a technical superiority, advanced human capabilities and experienced leadership could generally guarantee success of operations. Conventional warfare, which was a face-to-face military confrontation, determined the main boundaries of engagements allowing for learning from experience, both positive and negative, in order to master capabilities and prepare for the next war.

The Industrial Revolution initiated a change both of pace and speed of adaptation (Murray, Williamson 2009). Technological change opened new opportunities and threats both to the armed forces and their enemies. Thus, the modern army had to rush in new technologies to maintain a superior technical position as well as to adapt to new warfare conditions being constantly modified through the availability of new technologies to themselves as well as their enemies.

The need for organisational (military) adaptation has existed since the beginning of human war. However, the past century, and recent decades in significant ways, have greatly increased its importance and significance. Now success of military engagements depends essentially on the ability of a military organisation to adapt to rapidly changing conditions of warfare regardless of the fact that it can excel other military institution in the technological sense (Murray, Williamson 2009, pp. 1-40).

1.5. New conditions of war

The 21st century had a number of significant events that changed the face of the world forever. Starting from the First World War, through the Second World War to the Cold War – the view of the global security environment was constantly changing through continuous advance of technology used in peace and war. The armament race of the Cold War brought a substantial leap in the technological base that allowed military organisations to

significantly improve ways and means of making war both more precise and more lethal. The collapse of the Soviet Union shifted the world balance of power, making the United States a dominant country that changed a bipolar world into a unipolar one. This situation is about to change again as economies, such as China, India and others, become daily more influential. New technologies influence civilian life as well by connecting people, cities and countries in a one global web that links their future economies and cultures. This phenomenon is widely acknowledged and known as globalisation. Moreover, the modern world is now witnessing a great increase in population leading to higher speeds of urbanisation and local fights for resources and land with resulting power shifts. Due to globalisation and world connectivity 'world business', including global security environment now depends on collaborative work of allies, both global and regional. Every country should constantly monitor the overall situation in the world as well as continuously check the stability or change in its local area. Thus, the global security environment is now more than the business of one particular country or confrontation of two titans – it now includes the ability of all countries to play their roles in the process of keeping our world in peace and happiness.

This is a picture that is broadly described in the *"Future Land Warfare Report"* (*Future Land Warfare Report, Modernisation and Strategic Planning Division – Australian Army Headquarters 2014*). However, this is not the first time when enormous global changes are mentioned. For example, both the US and British armies have acknowledge this fact and have been debating correspondent shifts in warfare for some time (Barno 2014; Palazzo 2012).

These factors have a significant influence on the warfare conditions the Australian Army is currently operating under and are likely to be operating under in the near future. Thus, the modern operational conditions can be

characterised by new type of warfare that can be classed as irregular and asymmetrical (in other words non-conventional). The reason for that is the fact that the enemy has had to adapt at least in order to survive in their attempt to win. Their adaptation has led to the development of new ways of war that would utilise their own strong points while eliminating the weaknesses of their allies. That is what asymmetry of warfare is (Colonel Field 2009). This was a natural adaptation of the enemy to the fact that modern western countries have professionally trained armies with advanced equipment that makes them practically unbeatable in direct combat. Examples of asymmetrical warfare are terrorist attacks, insurgency, religious influence on population, illegal money flow, transnational crime, *"shadowy insurgents blended in with the population"* and others (Barno 2014). However, it is not true to say that there is no conventional, state-to-state, symmetric war anymore. On the contrary, it is acknowledged that modern warfare will demonstrate characteristics of both conventional and non-conventional warfare, but also will expand the variety of operations to peacekeeping and disaster recovery both in state and non-state confrontations. Moreover, due to high interconnectedness of the world, warfare has extended its physical and mental boundaries by moving operations into a number of various terrains, including urban ones, and also has increased the interactions with different societies and their values and cultures.

Therefore, the Australian Army needs to demonstrate a set of characteristics in order to be successful in this modern arena of war. The availability of new technologies invites the Army to master new skills and develop new experiences. It should be able to utilise new technologies in a masterly fashion. It should also develop a new capability to protect itself from the attacks on its technological support and communication systems as well as maintain its ability to operate in the 'old fashion' manner if new technology

is damaged or destroyed. The Army should be able to successfully operate within bigger military entities, ADF or allies, and demonstrate excellent tactical mobility (Lieutenant Colonel Ryan, Michael 2003). The ability to operate in various terrains and conduct several operations of various types, simultaneously, is a requirement for the modern Army. The significant skill of the Army should be its ability to operate with different societies and their cultures as well as know the cultural peculiarity of the enemy. The focus of the operations should be on *"defeating an enemy's will"* and having operations with an aim of *"disruption rather than destruction"* (Colonel Field 2009). Strategically the Army should be on the alert in situations both regional and global and take a rightful position in providing its services around the world.

All these required skills and experiences should be developed and built upon, but it should be never forgotten that an enemy has access to modern technologies and may effectively use all types of modern communication to influence the minds of a population. By doing that an enemy keeps adapting and sometimes with greater effort and at greater pace than western military forces.

Therefore, in the complex environment of modern day military operations, from combat situations to peacekeeping operations, it is necessary for an army that supports these activities to continuously adapt, structurally and functionally, to changing conditions to remain successful. Thus, the *"challenge for the Australian Army is to ensure that it is able to adapt to these changes to position itself for success on the battlespace of the future"* (*Army's Future Land Operating Concept* 2009).

1.6. Dealing with complexity

every war is inherently a nonlinear phenomenon, the conduct of which changes its character in ways that cannot be analytically predicted[3]

The term 'complex' keeps occurring in scholars' works published on various topics and every day discussions. It can be also easily found in military papers that contain conversations on complexity of operational environment, non-linearity of warfare conditions, increased dynamic of military engagements, etc. Thus, it is widely accepted now that the world is *complex* in many senses. But what does 'complex' really mean? How can we characterise and understand that something is complex? What theories can we use to understand this phenomenon better?

The answer to these questions is Complexity Theory (CT). Complexity Theory is a quite new theoretical direction that offers a way to view the modern world; the *"concepts of complexity science have presented a way of better describing and understanding dynamics and processes of change found in a range of physical and biological phenomena"* (Ben Ramalingam & with Toussaint Reba 2008). Complexity theory helps us understand the nature of complexity itself and provides ideas for how to deal with and even embrace it (Ryan, A 2009). Complexity theory is a possible way to overcome the difficulties that arise from applying the mechanistic rules of Newtonian physics and the concepts of a mechanical paradigm to modern world systems; systems that are characterised as complex rather than complicated. A meaningful part of the complexity theory is Complex Adaptive System theory (CAS) that underlines the continuous interconnectedness of the system's parts and the importance of adaptability. Application of CAS theory is now being widely used in various areas such as the study of commercial markets, ant colonies, traffic

[3] From "War, Strategy and Military Effectiveness" (Murray, Williamson 2011b, p. 31)

systems, urban planning, airline networks, seismology, and virus research. All these systems demonstrate the same characteristics that are distinctive to CAS. They start from the presence of diverse interdependent actors that have their own rules of behaviour. Since the actors' interactions are non-linear this makes the system itself non-linear, adding extra layer of complexity. Actors can self-organise in an unexpected manner creating new patterns of behaviour on a larger scale. At the same time the system is open to external changes and can easily absorb them in a dynamic way; these changes call for a reaction from the system's actors who in turn may change their rules of behaviour and interactions at any time. Moreover, as the processes of CAS are interlinked, so feedback loops play a significant role in adjusting the behaviours of both the actors' and their systems. To survive and succeed within such a web of unpredictable interactions and constantly changing external and internal rules, the actors should deal with the complexity of the system though continuous adaptation. Thus, adaptability plays a crucial role in the success of CAS and presents a key for effective work within a complex system.

Indeed, the modern global environment seems to be very chaotic and unpredictable and constantly changing. There are a wide range of actors (political, economic, military and social) that play their own role in maintaining its stability. At first glance these actors are independent as they have own interests, but the technologies of the information era tie them together in a web. As soon as different people, companies, countries and their economies are linked together they all can influence the positions of others globally. The behaviour, attitude, interests and actions of these different actors can significantly change the balance of power and lead to local crises of varying significance. The clearest example of this is the Global Financial Crisis (GFC) that started in the US and put the whole world at the

drastic risk of financial collapse. The GFC showed the extent to which economies of all countries are linked together and the irrelevance of making distinction between them. The GFC is a useful example of the emergent process of self-organisation that demonstrates the ability of players of financial systems to significantly adapt to pursue their goals and utilise the system's weaknesses and strengths. There are other factors, independent of human beings, that also impact on the world as *"[c]hange in the modern world has almost continuously found itself driven by impersonal factors, such as technology, economic depression, natural disasters, including plagues, as well as actions of human beings"* (Murray, Williamson 2011b, p. 19). Uncontrolled forces such as natural disasters add uncertainty and increase complexity. Indian Ocean earthquakes and the tsunami of 2004 affected the region's economy through the impact it had on tourism, fishing and agriculture; this in turn had the potential to create anxiety and disturbance in the region in general. Countries need to adapt to changing conditions in order to maintain their place in the world economy and political arena. The dynamics of world conditions enforce cooperation that in its turn aggregates them into bigger entities such as the Europe Union, Eurasian Economic Union, American, British, Canadian, Australian and New Zealand Armies' Program (ABCA Program) and others. The political and economic situation in the world forces countries to make continuous efforts to maintain their positions. This put responsibility on armed forces to react according to the various circumstances by assisting their own and other nations in self-defence, in times of crisis or in disaster relief, fighting insurgency, peacekeeping and conducting other operations. By doing this, the armed forces become actors of CAS and should also change and adapt to fulfil their mission.

Finally, the Army is a complex organisation. The structural complexity is presented by the number of organisational parts that are linked together

vertically through a Command and Control structure (C2) and horizontally across a range of functions. This combination of structure and function poses challenges for all kinds of communication as well as the disciplined behaviour of its human resources. A modern army has to be able to respond quickly to the changing nature of warfare and military engagement. Thus, the nature of a modern army is paradoxical. It has to be responsive to threat and yet requires a flexible organisation to act decisively. Moreover, an army is a complicated bureaucracy that is by definition difficult to manoeuvre and change.

The application of the CAS theory to current research helps to explain both the main aspects of the modern operational environment and organisational parameters of the Army as complex phenomena. Going further it is argued that the Army and its business within the modern military engagements could be viewed as a complex adaptive system that underlines its interactions with other actors and their environments. An important factor here is the need for constant adaptation both in terms of single actors (e.g., armies, navies, enemies, etc.) and the entire (military) system.

1.7. How to adapt: adaptation through change and learning

The objectives of an army's capability and effectiveness, often understood as '*fit for purpose*', means that an army must always be in a state of readiness to change, not only to keep abreast of the methods and tools of warfare technology that continuously evolve but ideally to be in strategic advance of the enemy operating in the conditions of complex asymmetric warfare. As difficult as it is, an army has no choice but to embrace new 'out of the box' thinking and get to grips with the mysteries of complex systems thinking in order to adapt and remain effective. A modern army has to seek continuous improvement through regular and systemic organisational adaptation. The

process of organisational adaptation is viewed through the processes of organisational change and learning.

Organisational adaptation is *"an internal emergent property of organisations that facilitates successful organisational change"* and attracts greater interest (Omarova, Ireland & Gorod 2012). The literature related to organisational change is extensive and stems from several disciplines including political science, anthropology, biology, physics, psychology, as well as business and management sciences (Graetz et al. 2006; Kezar 2001). This research work focuses on system characteristics that contribute to organisational adaptability. Our research utilises a complexity theory perspective that is viewed as a part of the evolutionary and teleological directions of organisational change theory development; however, social and cultural constraints are considered.

The current work uses one of the descriptive frameworks, the Conceptual Framework for Adaptation (CFA), that was developed by the Defence Science and Technology Group (DST Group) (Grisogono 2010). It builds on biological evolution and CAS theories, and offers a "*conceptual framework for thinking about adaptability and about how to apply it*" (Grisogono 2005). Application of the CFA to analysing organisational adaptability is recognition of the fact that modern organisations are viewed as complex systems with nonlinear interactions among its components. This stresses the importance of complexity theory, which underlines the dynamics of the modern environment and drives *"the need for new theories and tools to cope with organizational change"* (Eoyang, GH 2011). However, it should be acknowledged here that there are alternative points of view that remain critical of incorporating aspects of complexity theory into organisational theories. They mainly question the way that complexity theory should be applied – whether it be metaphorically, analytically or prescriptively (Burnes

2005). The current state of CFA development and application is more metaphorical than prescriptive, opening the door to a huge opportunity for future research and model clarification, including the development of practical prescriptive models that are readily applicable to relevant domains.

Organisational adaptation is closely linked to the theories of Organisational Learning and Systems thinking. Organisational learning is a *"process of change in cognition and behaviour occurring within and between organizations. Its importance to the practice of management is perhaps best captured by the view that the capacity of an organization to learn faster than its competitors may be the only sustainable competitive advantage. In addition, as environments become more turbulent, complex, and uncertain, organizations need to develop the capacity to adapt through learning"* (Crossan 2007). 'Systems thinking' is a concept for understanding how systems behave, by describing the system components and their inter-relationships. The modern idea of systems thinking is based on a belief that *"systems cannot be understood by analysis – the properties of the parts can only be understood within the larger context of whole"* (Merali & Allen 2011). It is necessary to review processes of organisational learning holistically, paying attention to links (recognising their non-linearity) between the breakdown of individual processes and system components, in order to represent the whole organisational adaptation from a system thinking perspective.

1.8. Case study and research questions

Using the Australian Army as an exemplar, this research examines the ability of complex organisations to adapt – a quality that is seen as one of the key properties for successful operations. In particular, in 2008, in response to future complex environments the Australian Army released '*Adaptive Campaigning'* and then launched the Adaptive Army Initiative (AAI) (*Army's*

Future Land Operating Concept 2009). This was an ambitious program to put its entire organisation on an adaptive footing – something *"far more than just a restructure of higher command and control arrangement, the adaptive army initiative pursues a systemic approach to adaptation across all levels of the Army"* (Lieutenant Colonel Ryan, M 2009).

This research uses the AAI as a case of organisational change and adaptation. The review of the AAI was imitated in order to explore from a theoretical perspective how the Army as a complex organisation and given its multiple functions and levels of command and control, actively manages its adaptation in a continuously changing environment. During the AAI review we conducted 19 face-to-face interviews that included 13 senior Officers the Australian Army, 3 mid-ranking Army Officers and 3 others external to the Army. We also acknowledge that organisational learning plays crucial role in a way the Army adapts to external requirements. To cover this ground we conducted the review of the lessons mechanisms, Army Lessons Network (ALN), employed in the Australian Army; the focus being on the operational aspects (process, structures and roles) that make an organisation adaptable to changing conditions. An appraisal of the lessons processes in the Army, through the ALN review, is used to understand the role of organisational learning as a mechanism of change.

A number of research questions arose, preceded by the main research question:

How does a modern professional army adapt, structurally and functionally, to the changing nature of military engagement, which is increasingly characterised by complexities arising outside of conventional operations?

RQ1. In modern times, how has the Australian Army adapted to new challenges to operational effectiveness at the whole system organisational

level in response to significant changes to the nature of warfare and related military engagement?

RQ2. What importance should be attached to two recent Army leadership initiatives AAI inspired by the need to meet the challenges of change?

RQ3. What effective difference have these initiatives made, as perceived and interpreted by senior Army leaders?

RQ4. Taking the AAI and ALN as change drivers in the Army, in what ways can these initiatives be understood as practical expressions of CAS theory?

RQ5. Taking the insights and interpretations of the senior Army Officers about these two change drivers, what new theory-building contribution can be made to existing CAS theory in relation to the adaptive capability of the modern Australian Army?

RQ6. Using single case study of the Australian Army how can CFA be evolved to both improve its theoretical basis and practical application?

To answer the research questions the thesis uses the CFA as a methodological basis for the AAI and ALN case studies.

1.9. Thesis structure

In order to fully reveal the organisational adaptation of the Australian Army this thesis is structured as follows:

Chapter 2 starts with the contextual background of modem militaries showing the shift from conventional to complex warfare. For this we describe two different types of complexity. The first part concerns the different changes in the global security environment and operational conditions; the second part explains the complexity of militaries where a formal bureaucratic structure of command and control represents one aspect and socio-cultural

features reveal the other. We summarise external and internal complexities with the claim that modern military organisations are facing a need for change to be efficient and successful in the new operating conditions. To unsubstantiated this claim, we provide examples of recent adaptation within the US and UK armies. That leads us to formulate the description of the recent case of organisational change within the Australian Army. Then we move to the academic literature to learn about organisational change and learning and systems thinking, in order to understand how these theories can help us to fully grasp the process of organisational adaptation. We found that CAS theory is a promising way to describe modern armies, their operational environment and change process. We also acknowledge that organisational learning is a strong mechanism for change, while the whole organisation should be viewed from this system thinking perspective. Thus, the second chapter finishes with the description of the Conceptual Framework for Adaptation (CFA) that represents the CAS approach to understanding organisational change and how it is used as to carry out the study.

Chapter 3 is concerned with the practical aspects of the thesis and explains how the research was conducted. The first part contains a description of the two main practical sections of the study: the case of organisational change through the Adaptive Army Initiative (AAI) interviews and the understanding of processes of organisational learning through the Army lessons Network (ALN) review. The last part of the third chapter explores the philosophical ground that places this thesis within a wider knowledge domain.

Chapter 4 reports on the data being collected. For that the chapter is divided into three main parts. The first part generally explains how organisational change was designed, implemented and what results can be seen so far. Then we move to a general conversation on organisational adaptability in the

Australian Army. Third, we talk about our findings relating to the processes of organisational learning. The data analysis was done using the CFA that allowed us to demonstrate properties of the organisation that contribute to its adaptability. Finally, we synthesise the collected data through a comparison with what we learned from the main characteristics of CAS. Through this comparison we are able to demonstrate that the Australian Army and its recent organisational change are clear examples of CAS.

Chapter 5 is concerned with knowledge contribution. Through the study of the recent case of organisational change in the Australian Army and its processes of organisational learning it was found that CAS theory is lacking in one area – a socio-cultural dimension. This important domain adds an extra layer to the overall complexity of CAS since it touches invisible and difficult to manage parameters of human organisations. Acknowledgement of this fact allows us also to add knowledge to the CFA through a description of an adaptive leadership and adaptive culture. Finally, we were able to identify the generic characteristics of an adaptive army. We finish chapter 5 with proposed directions for future research.

Chapter 2
Literature review

We suggest that the way to approach reading this literature review is to apply the metaphor of following a guided walk through a landscape of ideas and concepts around the complexities of military organisations and the imperative to adapt to changing times. The guided walk metaphor points out only the key features rather than probe into any significant details since our journey needs to be completed. Therefore, the literature review is not a close examination of various schools of thought and academic controversies that exist around the interpretation of the military as a complex organisation. The purpose of the literature review is to demonstrate that there is a great deal of writing on the subject-matter as a background to the particular and narrower focus of the thesis, which is primarily about the nature of the Adaptive Army Initiative (AAI) as a strategy and vehicle for organisational adaptation in the Australian Army.

This research was motivated by a curiosity about how a modern military organisation changes itself in order to be effective in the modern dynamic world. In other words it concerns an idea of reviewing a modern complex organisation and its ability to adapt to changed conditions of work as well as appraise its internal ability to maintain an appropriate level of effectiveness through the process of continuous adaptation. To deal with organisational adaptation the following topics were reviewed: organisational change, organisational learning, complexity theory, and aspects of leadership and organisational culture. It is recognised that in order to succeed a military organisation needs to constantly change and learn. Going further, the research states that organisational adaptation occurs through organisational

change and processes of organisational learning. Increased dynamic, interconnectedness and a general level of complexity of the current world turned our research attention to complexity theory, which is a new branch of the organisation theories that promises to provide an alternative approach to reviewing organisational development. Complexity theory aims to develop a holistic view of a system acknowledging non-linear behaviours of a system and its constituent parts.

A narrower focus of this research is about how a military organisation such as an army can adapt to continuously changing operational conditions. A military organisation is a clear case of organisational adaptation simply because it represents an extreme where failure is an unacceptable condition that constantly forces an army to change, learn and adapt. Moreover, an army is a good example that incorporates different types of complexity – external and internal. It is especially true in modern operational conditions where the level of unpredictability is very high, making it almost impossible to define and prepare for particular war scenarios that call for in-built and well-advanced organisational adaptation. Being forced to adapt by its operational environment, an army faces its own internal complexity that deals with its structure, functions and even personal relationships. Here we also discuss two additional topics that impact the ability of an organisation to adapt – the role of leadership and the organisational culture that underlines the importance of seeing an army as a social organisation.

The literature review covers the following topics (Figure 1).

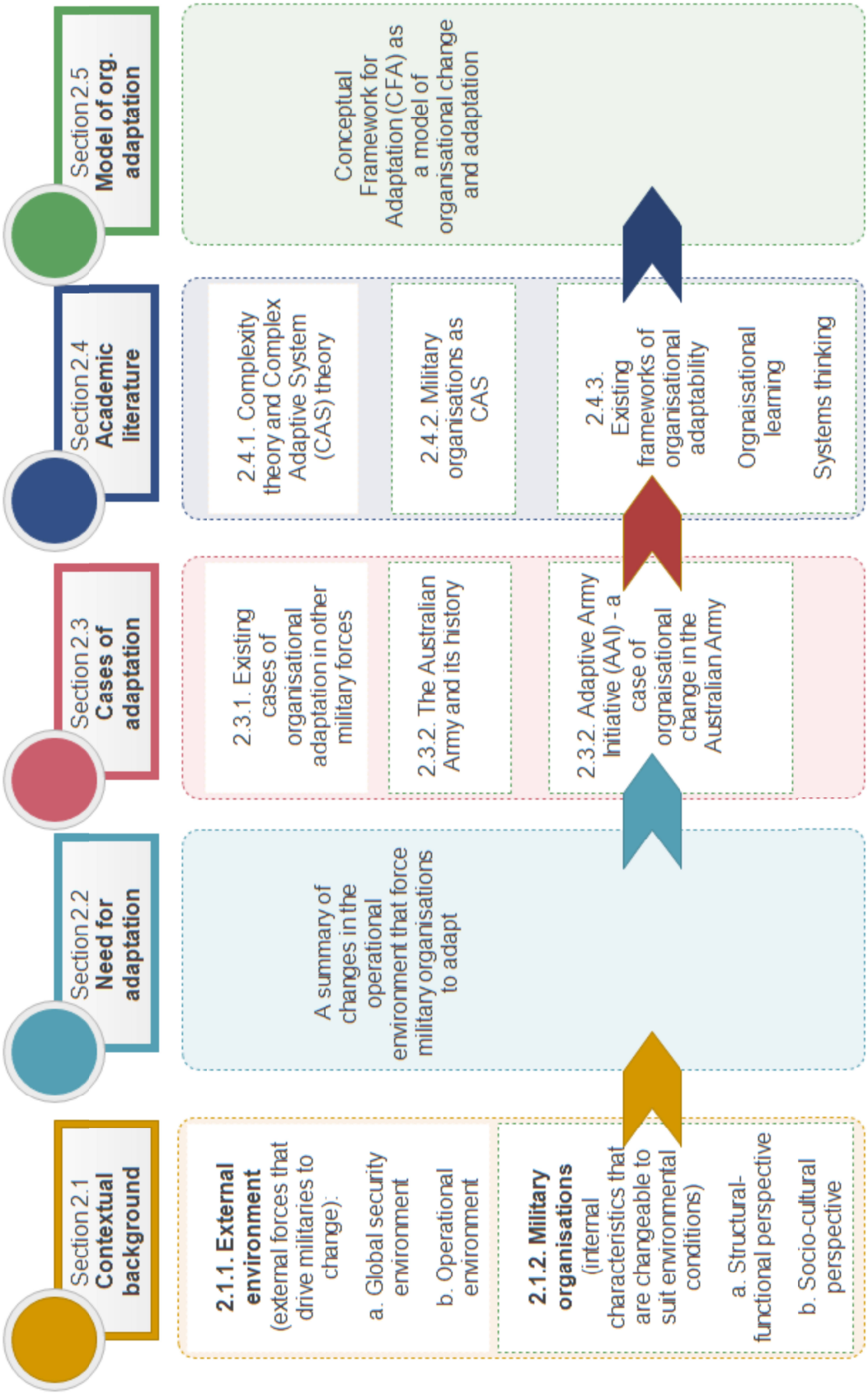

Figure 1. Chapter 2 structure

Section 2.1 starts from the review of the contextual background that is divided in two types of complexity of a military organisation – external and internal. External complexity demonstrates the narrative for an army to change as significant shifts in the global security and operational environments have been admitted and call for an appropriate reaction. On top of the recognition that war is a complex phenomenon and organisational adaptation is an indispensable condition for an army to be successful, it is shown that new operational conditions reinforce a need for adaptation. Internal complexity deals with an army as an organisation whose goal is to defend the nation and maintain a stability level in the region and partially in the whole world. To do that an army needs to run its everyday business of recruiting, training, educating soldiers; the process that is done through a highly hierarchical command-and-control structure complicated by a social dimension.

Section 2.2 demonstrates the need for change.

Section 2.3 provides examples of organisational change and adaptation that can be found in the military literature: the US, British military forces have already passed through the process of change to adjust themselves to modern operational conditions. Then we move to the Australian Army that was chosen as a case study for the current research as it recently passed through a series of big organisational changes. The thesis pays special attention to only one part- called the Adaptive Army Initiative (AAI). A history of the Australian Army, including its recent 10 year experience in Afghanistan, has shown clear

evidence of the Australian Army's successful organisational adaptation at war. The final part of the literature review describes a CFA as an approach to appraise the recent organisational change in the Australian Army.

Section 2.4 refers to the academic literature to find theories and approaches that can help us to appraise organisational change in an army. First, we demonstrate the main ideas of the complexity theory and its particular part – Complex Adaptive System (CAS). Then we underline the fact that the CAS theory is a way to view the modern operational environment and an army in it; it helps to explain both external and internal complexities. Third, we discuss existing models of organisational adaptation and describe the Conceptual Framework for Adaptation (CFA) as the most suitable model for this research.

Section 2.5 focuses attention to the CFA that provides a way of representing a holistic view of an army utilising the main principles of systems thinking. Moreover, noting the fact that organisational leaning is a crucial part of the organisational change and adaptation, we discuss this topic in general terms. Particular attention is given to the information processing approach (Huber 1991, 2004) as it has a strong relationship with the ideas expressed in the CFA.

2.1. Contextual background

This part covers the contextual background of the research and will focus on military organisations and their operational environment. The review of the military literature that follows is mainly intended to identify the two major themes of interest in the research. Our interest is modest in simply identifying those writers who have argued *why* armies need to adapt to change and *why* as well as *how* the nature of warfare in any of its forms has moved from the complicated to complex. It is therefore not a discourse about different perspectives taken by the many authors that have written on these two themes, as this would take a thesis in itself.

The review of the military literature shows the interconnectedness of three aspects of the military engagements (global security environment, operational environment and military organisations) and reinforces the idea of a need to review a military organisation and its working environment holistically (Figure 2). Thus, we discuss the global factors that transform operational environments and demand responses from military organisations to the changes in the global conditions. The review of military literature also uncovers a significant shift in operational conditions during the last two decades. It is widely acknowledged that modern warfare has changed from the regular to the irregular or complex. Therefore, the description of the global security environment, operational environment and military organisations has been done in relation to two different periods of time – the Cold War and the current state of the world – that differ widely from each other and allow us to differentiate regular warfare from the irregular.

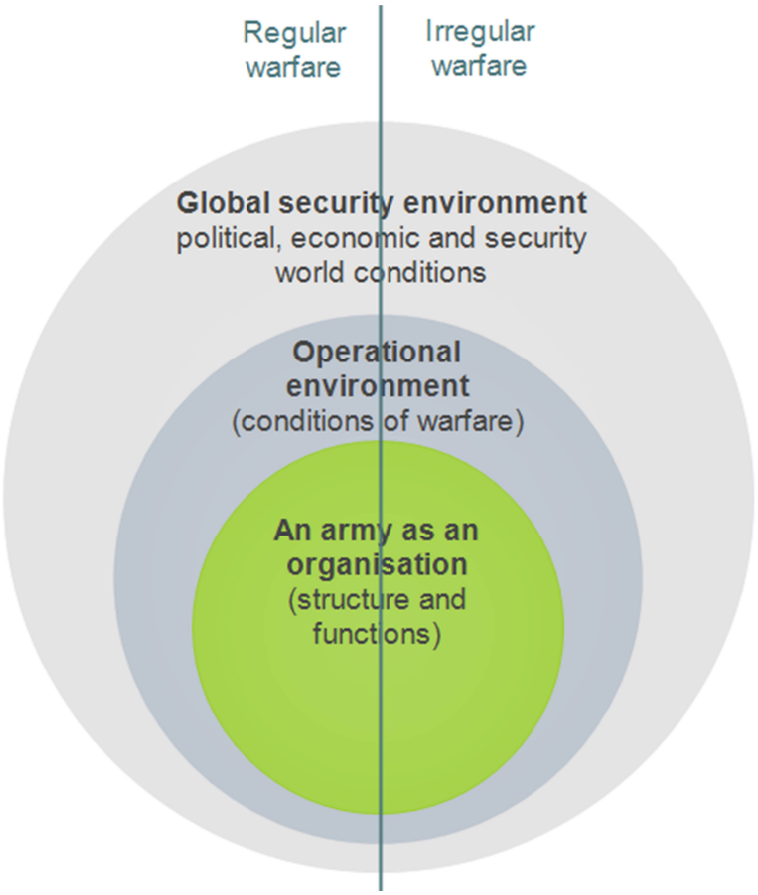

Figure 2. Aspects of the military engagements

The background is described in an abstract mode, without any reference to a particular military force. The contextual background aims to demonstrate the general conditions under which Western military forces operate now. A specific linkage to the Australian Army and its case of adaptation will be provided later.

2.1.1. External environment

2.1.1.1. Global security environment

To demonstrate the difference between regular and irregular warfare, we will describe two periods of time – the Cold War and post-Cold War (Figure 3). Regular warfare conditions relate to the Cold War period of time, while irregular warfare conditions are relevant to the post-Cold War years. It is

acknowledge that there is an extensive war history that covers time before the Cold War and describes various types of warfare (e.g., have, not-haves, guerrilla). However, to demonstrate the need for change and adaptation in a modern military organisation it would be sufficient to cover the period of the second half of the 20th and the beginning of the 21st century.

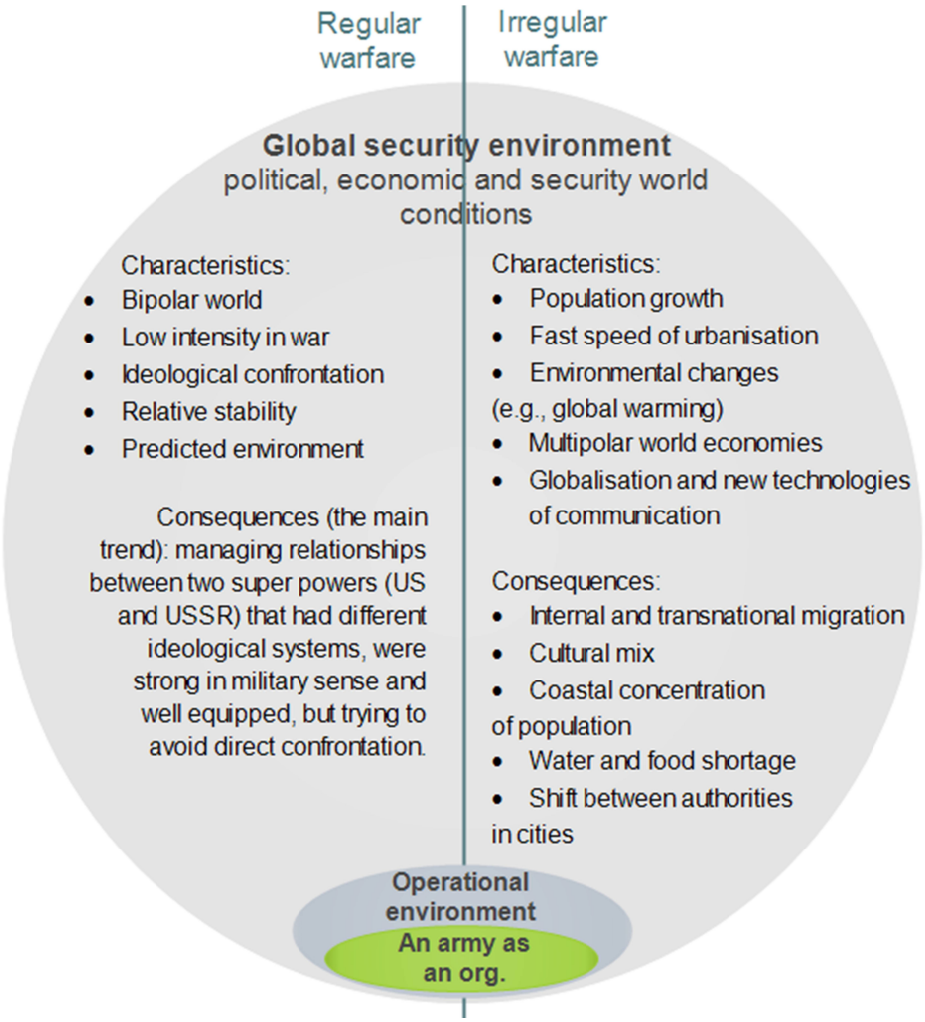

Figure 3. Conditions of the global security environment

The period of post-World War II, known as the Cold War, was a time of confrontation between two super powers, the United State and the Soviet Union. Ideologically different countries were competing against each other in an attempt to achieve the greatest influence on the world as well as to reach weapon superiority. This was a bipolar world with clear lines of interests and influence marked as a period of low intensity in war. The Cold War

conditions dictated the way the United States and the Soviet Union were dealing with the defence policies and decisions and national security strategies (Khalizard 1995). The defence planning was focused on developing and mastering a number of scenarios that reflected *"a single operations plan for the defence of Western Europe"* (Davis & Finch 1993) in case of the US and to protect the territory of the Soviet Union and its allies in case of the USSR. More generally, the global security policies were focused on managing *"relationships between two heavily militarized blocs that shared a common interest in avoiding direct confrontation, but nevertheless remained deeply divided along ideological lines"* (Berdal 1999). The global security itself was expressed in terms in *"military threats to national security"* (Baldwin 1995) that took into account the confrontation between the US and the USSR.

However, it is not absolutely right to say that the Cold War period was as simple as this. The strategy of spreading ideological influence in the world and the avoidance of a possible straight nuclear attack made the US and the USSR support peripheral states by providing them with financial, social, diplomatic support, and military equipment (Winnefeld et al. 1995). This in turn increased the tension in these areas making it possible to conduct a war between the US and the USSR outside their main territories (e.g., Vietnam, Cambodia, Korea and Afghanistan). On the other hand, the regional influence of these two giants had another effect on the global security environment. In attempt to widespread the influence in the global arena both super-powers invested a huge amount of effort and resources to maintain an appropriate level of stability and peace in those areas by suppressing ethnic forces through intensive ideological propaganda (Winnefeld et al. 1995). However, even taking into account these complications generated by the Cold War and the fact that the world was under the threat of highly lethal

warfare, the global security conditions were quite stable, predictable, well-planned, and certain enough.

This relatively stable period of the Cold War period had significant consequences for the whole world and still has to some extent influences (Berdal 1999). The armament race of that period resulted in the development and installation of a highly lethal nuclear weapon stockpile on two continents. This new military technology, the nuclear weapon, became well developed. Even now a number of countries (e.g., China, India and Pakistan) have access to and knowledge of this technology, leading to uncertainty over the possible usage of this highly lethal weapon and its damaging potential effect on current global conditions. Beside this weapon of mass destruction a huge amount of conventional light weaponry was produced. These weapons were later distributed across whole world through the support programs of the US and the USSR to their military allies and through the disarmament program of the post-Cold War period; this in turn has been shaping the past and current conflicts. An obvious example is the Kalashnikov rifle which is a simple and widely available weapon that can be found in every part of the world. It is an interesting fact that pictures of Kalashnikovs can be found on the flags and national emblems of some African countries – symbolising the role it played in their fight for independence. Even now, Kalashnikovs are being produced and sold everywhere.

Another more general aspect of the Cold War concerns the way the countries involved in it as well as organisations built around were structured, i.e. they were able to respond to the requirements of that particular war. A scenario of well-defined confrontation made countries and their systems rigid, inflexible and one-side focused.

The situation significantly changed with the collapse of the Soviet Union. First, the world was transformed from a bipolar to unipolar state as there were no other countries strong enough to oppose the US. From the Western countries point of view, there was no one left to confront. At the first glance it could be viewed as a total victory, having gained world dominance. However, the collapse of the USSR had a huge impact on the global security environment. One of the factors was the discontinued support given by the USSR to the satellite countries. That left developing countries in limbo, lost between 'old-dead' and new 'yet-to-emerge' ideological bases (Winnefeld et al. 1995). Ex satellite Soviet countries started boiling inside in a fight for power as ethnic conflicts previously controlled and held back by the USSR exploded. The situation was aggravated by the ease of access to the weapons that left behind by the Soviet Army. Some of the ex-Soviet countries experienced the upsurge of fundamental Islam (Winnefeld et al. 1995), an ideology that later would be used by extremists to threaten the Western world. Other satellite countries faced growing ethnic conflicts.

Thus, the post-Cold war period created a number of failed states well equipped with weapons and hungry for power, sovereignty and personal identity. The world was reshaping itself by adding uncertainty to what had been a quite well-managed US-USSR model of global security. Finally, it is necessary to bear in mind that this constantly changing nature of the world balance of power still continues. The collapse of the Soviet Union has shifted the world power balance, making the United States the dominant country and changing a bipolar world into unipolar one. This situation may change again as the economies of other players, such as China and India, become daily more influential.

However, the political arena is not the only force that impacts on the global security environment. There are other factors that have been modifying it in

unexpected ways. These factors are globalisation, changes in demographics including urbanisation, technological development, global warming, and the rapid development of new economies. There are many military publications that contain description of the factors that are currently shaping the global security environment. For example, both the US and British armies acknowledge these influences and have been debating the need for corresponding shifts in warfare techniques for some time (Barno 2014; Palazzo 2012); in addition, a significant portion of the military works published by research organisations like the RAND Corporation describe the changing conditions of global security. However, a recent document (Future Land Warfare Report by the Australian Army Headquarters (*Future Land Warfare Report, Modernisation and Strategic Planning Division – Australian Army Headquarters* 2014) summarises them in a structured and clear way. It will be used as the main source to discuss the factors impacting on the modern world and its security.

First of all the current demographic situation is a significant factor that influences the modern world. A drastic increase in world population has been observed since the end of the 20th century. The major portion of the population growth falls on the developing countries, while wealthier countries have the opposite trend of rapidly aging populations (*Future Land Warfare Report, Modernisation and Strategic Planning Division – Australian Army Headquarters* 2014; Winnefeld et al. 1995). In the developing countries people tend to seek for better places to live and move to other rural regions, cities or states with a hope for having better opportunities there. On the other hand, the demographic situation in developed countries calls for extra manpower and invites new migrants to support their economy. Thus, the modern migration trend covers people moving both within states and transnationally. Whatever way, it results in a mixture of people with

different cultures and beliefs that increase a chance of possible *"cultural clashes"* (*Future Land Warfare Report, Modernisation and Strategic Planning Division – Australian Army Headquarters* 2014). The situation is further complicated by the global trend towards urbanisation. One aspect of urbanisation is positive, since it improves the general level of wealth. On the other hand, in a competing race for economic development, developing countries seek ways to speed up the process of development by investing more resources in cities rather than in rural areas. This creates a difference in opportunities for the population and forces people to move into cities, thus increasing their density and making life even more highly competitive. As the majority of cities are located in the coastal areas, the increased population living near the ocean will lead to a shortage of food and water. As a result, urban areas are expanding with a great numbers of people of different cultures and values, all of whom are involved in competition for essential resources. This factor, combined with the inability of governments to provide appropriate social and security systems to maintain order and stability in these growing cities, opens up an opportunity for self-organised groups to develop, groups with their own social rules ready to ignore the existing social norms or rule of law. This creates fertile ground for the development of organised crime, terrorism and insurgency (*Future Land Warfare Report, Modernisation and Strategic Planning Division – Australian Army Headquarters* 2014). Environmental factors, such as the global warming and natural disasters, simply aggravate the already highly competitive conditions of the coastal areas and increase the demand for land, natural resources, food and water.

Second, globalisation in combination with modern technology is another important factor. New communication technologies influence everyday life by connecting people, cities and countries in one global web that links

together their economies, cultures and the future of the whole world. The connecting properties of new communication technologies, on the one hand increases the world economy by allowing information, ideas, goods and services to be easily shared. There are a number of examples of the positive usage of these communication technologies – e-mails, web pages, internet shops, online learning, etc. In particular a clear example is social networking that intensifies this interconnectedness and simplifies ways of information sharing. The downside, however, of these communication technologies is that they can be exploited by an enemy to enhance organised crime, improve drug and weapon traffic (Spillmann & Wenger 1999, p. 324). It is known fact that the 9-11 disaster was prepared in chat rooms by utilizing the simplest communication tools. Thus, the inability to fully control these communication systems, and their easy availability to vast numbers of people, makes it possible for self-organised groups to appear: *"non-state and semi-state actors [as well as] supra-national organisations within the cyber domain [that potentially allow] any individual to influence political outcomes, transform perceptions of event, and create positive or negative responses"* (*Future Land Warfare Report, Modernisation and Strategic Planning Division – Australian Army Headquarters* 2014).

Summarising the conditions of the global security environment it is possible to say that now that no country can see itself in isolation since its economic and political situation is closely linked to the attitude and behaviour of other countries, non-state actors, and its citizens; all of whom are already actively participating in virtual international groups influenced by the ideas expressed online. Globalisation in combination with the new communication technologies means that 'world business', including the global security environment, is now dependent on the collaboration of different countries, and their civil and military allies, both at a global and regional level. It is a

requirement of modern times that every country should constantly monitor the overall situation in the world as well as continuously check the stability or change in its local area. Therefore, the global security environment is now more than the business of one particular country or a matter of managing the confrontation of two titans – it now requires that all countries play their individual and collective roles in the process of keeping our world in peace and harmony.

2.1.1.2. Operational environment

What impact does the global security environment have on warfare conditions? This is an area that will be investigated in what follows. The answer to this questions lines in a straight comparison between regular and irregular warfare.

The current discussions around modern warfare underline its irregularity and acknowledge the fact that it is in general terms quite different to a regular one. However, it should be noted that another way of thinking about warfare is to recognise the fact that both types of warfare have always existed simultaneously and can replace each other if necessary. This statement is hard to criticise since historical examples of colonial wars in the 19th century show the presence of both regular and irregular methods of war. On the one hand, colonist fought against poorly organised indigenous irregular forces that had better knowledge of local terrain and situation and used this as an advantage to weaken a better equipped and educated opponent. In that case collaboration with local people was one of the key success factors for colonists (Baarda & Verweij 2009, p. 4). On the other hand, there was an art of classical warfare against *"well-organised, industrial nations"*, that was actually an easier endeavour as it involved *"fight in open battle"* (Baarda & Verweij 2009, p. 4). World War I is another example of

regular warfare; however, even then a chemical weapon that was used by Germans was a deviation from the regular warfare methods.

This position reinforces the idea that the complex nature of war incorporates both forms of warfare and eliminates the difference between them; thus, *"wars may be waged by methods that contemporary norms regard as irregular"* (Gray 2007, p. 40). This way of thinking is based on the Clausewitzian[4] argument that *"all wars are things of the same nature"* and concludes that there are *"no irregular wars obedient to some distinctive nature of their own"* (Gray 2007, p. 41). However, it is also admitted that there are two possible ways of distinguishing types of warfare, regular and irregular: the first way talks about the character of combatants (if they are regular troops or not), and the second way is concerned with modes of operation (e.g., guerrilla warfare, terrorism, etc.) (Gray 2007, p. 42). For the purpose of this research the distinction between regular and irregular warfare will still be used and based on the two classifications provided. It acknowledges that war, being a complex phenomenon, can move from irregular to regular form and back again. However, it also recognises that a modern global security environment opens huge opportunities for application of non-standard (irregular) ways of conducting war that in turn shape the operational requirements of a modern army. Thus, the discussion that follows is based on the essential differences between regular and irregular warfare.

Regular warfare conditions are linked to the idea of a direct confrontation between two or more states that utilise conventional weapons (not biological, nuclear or chemical), conventional forces and apply classic battlefield tactics. Regular warfare also uses the term '*face-to-face*' confrontation when forces of

[4] "Carl von Clausewitz, in full Carl Philipp Gottlieb von Clausewitz (born June 1, 1780, Burg, near Magdeburg, Prussia [Germany]—died Nov. 16, 1831, Breslau, Silesia [now Wrocław, Pol.]), Prussian general and military thinker, whose work Vom Kriege (1832; On War) has become one of the most respected classics on military strategy" (Gat n.d.).

both sides are well defined and have as an aim to destroy the enemy's military potential and reduce its capacity to fight.

While regular warfare implies the presence of a physical confrontation between two or more states, it is still possible to relate this concept to the Cold War period, where two super powers confronted each other in an ideological arena with the extensive support of military forces. The following description gives a good explanation of the conventionality or regularity of warfare during the Cold War period explained by the Lieutenant General David W. Barno[5], who shares the US perspective. The US perspective shows a general Western position towards conditions of warfare in the second half of the 20th century.

> *"From soon after World War II until the end of the Cold War – a period of nearly half a century – the U.S. military was animated by the spectre of global war with the Soviet Union. For land forces,* ***the primary battlefield was seen as Western Europe, where the threat was clear and present:*** *Warsaw Pact armored formations lined up along the borders that defined the "Iron Curtain" separating the occupied post-war satellites of the Soviet Union from the free states to the west.* ***The danger was obvious:*** *tens of thousands of Warsaw Pact tanks and armored vehicles in readiness, thousands of combat aircraft at the ready on airfields, and further to the east, intercontinental ballistic missile fields, strategic bombers, and the Russian deep sea fleet with nuclear-armed ships and submarines […] For the U.S. military during this 50-year period, war was not hypothetical; the potential for* ***a real war to be fought against a known adversary on clearly defined terrain*** *was ever present. Moreover, not only did the enemy have a name (the Warsaw Pact); it also had observable military formations, advanced weaponry, and highly developed doctrines of battle—all of which became the subject of intense study among the militaries of the United*

[5] "Leutenant General David W. Barno, US (Ret.), is Director of the Near East South Asia Center for Strategic Studies at the National Defense University. From October 2003 to May 2005, General Barno served as overall commander of U.S. and coalition military operations in Afghanistan"(Lieutenant General Barno 2014).

> *States and its allies.* ***Predictability and an unusual degree of certainty****—in enemy, location, equipment, tactics—became an expected norm for military planning.* ***Uncertainty was reduced to nuances*** *of when, where, and how to apply the "knowns" of doctrine, tactics, and equipment that the Warsaw Pact employed.* ***Complex operations were no more than how to best employ combined arms****—infantry, tanks, and artillery together with airpower—to defeat the Soviets on the European battlefield" [emphasis is not original] (Lieutenant General Barno 2014).*

Thus, the Cold War was an example of regular warfare. Given a known enemy and its estimated capability, a clearly defined terrain with an understanding of the advantages and disadvantages of different battlefields, a high level of predictability and reduced uncertainty, a complexity of operations expressed in ability to utilise military capabilities in hand – these are all characteristics of the conditions of warfare at that time. LTGEN Barno further states that military planning and training were developed in order to *"conventionally defeat a massive Soviet armored invasion of Western Europe by attacking all echelons of invading force in the close and deep fight simultaneously"* (Lieutenant General Barno 2014). This is another clear description of the conventionality of warfare of the Cold War period.

What has changed since then? Why are we talking about irregularity and complexity of warfare now? What is different to the conditions of war that were known in the second half of the 20th century? LTGEN Barno further states:

> *"Yet conflicts today have evolved dramatically from the conventional "big war" environment of the ALB [AirLand Battle] world of the 1980s. Rather than a nation-state adversary armed with conventional military capabilities that very much mirrored our own,* ***today we are dealing with a world of asymmetric threats – fighting shadowy adversaries often operating at the murky nexus of terrorism, transnational crime, and illicit global flow of money****" [emphasis is not original] (Lieutenant General Barno 2014).*

Thus, warfare has changed its face by moving from the 'big war' concept to engagement in smaller-scale operations. It is not true to argue that this 'big war' period did not include small-scale operations; however, they started playing a more significant role after the collapse of the bipolar world – thus, modern wars are all about participating in small local diversified operations (*From Sideshow to Centre Stage: Military Operations Other Than War* 1997). There is a vast variety of possible operations now: fighting insurgencies and counterinsurgencies, combatting terrorism, rescuing civilians from war zones, assisting in disaster relief and peacekeeping operations and many other tasks where the support of military forces might be required. While conventional[6] forces (regular, professional, organised, and well-equipped) are used in these operations, the reality shows that modern warfare requires both a different approach with different capabilities. What this difference is and why it emerged will be shown below.

One of the main reasons for this changing face of warfare is the current 'unipolarity' of the world, where the US is the superpower that is unbeatable in any direct conflict. Moreover, this unipolar superiority puts the dominant superpower in a position to decide ways to influence the course of global actions by defining values, conducting continuous war against a perceived evil and all possible subsequent interventions (Baarda & Verweij 2009). Not surprisingly, the enemy is adapting to the circumstances where it does not have the technological advantage that the United States and its friendly forces have; thus, irregular warfare *"has become attractive, if not the most preferred options for adversaries"* (*Irregular Warfare: Air Force Doctrine Document 3-2* 2013). The enemy's response is to utilise various means of fighting with

[6] Conventional – "Activities, operations, organizations, capabilities, etc., of the regular armed forced of a country that are capable of conducting military operations using non-nuclear weapons, but excluding designated special operations forces"(*Irregular Warfare (IW) Joint Operating Concept (JOC), Version 1.0* 2007)

the professional forces to *"reduce America' high-tech military advantages and draw its soldiers into more close-range battles with greater casualty risks for the American soldiers"* (Baarda & Verweij 2009, p. 36). This is nothing more than a natural adaptation aimed at protecting the enemy's own beliefs and wishes (whichever side, light or dark, they stand for).

Moving further into this discussion, one would expect to see a definition of 'irregular warfare' that would clearly describe its characteristics and underline the main difficulties modern armies have to face. However, as has been demonstrated in various literature sources, it is hard to create such a definition that can cover all parameters (both real and potential) of irregular warfare. Several attempts have been made to define this irregularity of warfare, but as yet there is still no universally accepted definition. Having stated that, it is still possible to provide the most commonly used definition and provide some clarification to uncover all the various meanings included in it.

> *"A violent struggle among state and non-state actors for legitimacy and influence over the relevant populations. IW favors indirect and asymmetric approaches, though it may employ the full range of military and other capacities, in order to erode an adversary's power, influence, and will" (Irregular Warfare (IW) Joint Operating Concept (JOC), Version 1.0 2007).*

Others can provide further clarification of that definition; however it is not an aim of this research to examine all existing positions on defining irregular warfare. Our intention is to show how warfare has changed since the previous century. We used a number of literature sources that, from our perspective, give a basic description of irregular warfare. These sources are: *Future Land Warfare Report 2014* developed by the Australian Army (*Future Land Warfare Report, Modernisation and Strategic Planning Division – Australian Army Headquarters* 2014); *Irregular Warfare (IW) Joint Operating Concept (JOC)*

developed by the Department of Defense in the US (*Irregular Warfare (IW) Joint Operating Concept (JOC), Version 1.0* 2007); a paper *Irregular Warfare: One Nature, Many Characteristics* published in the US Air Force-Sponsored journal (Gray 2007); *Air Force Doctrine Document 3-2*, Air Force of the US (*Irregular Warfare: Air Force Doctrine Document 3-2* 2013).

One of the most important aspects contained in the above relates to the statement that irregular warfare concerns the battle for the minds of the population, something reinforced by the ideological ideas being nourished in local people. Through its influence on the local population, the enemy is able to involve civilians in war in order to obtain the control, support of and influence over them, while conventional warfare is based on the assumption that fighting happens against organised military forces with a minimal interference from the local population (*Irregular Warfare (IW) Joint Operating Concept (JOC), Version 1.0* 2007). In this context the knowledge of culture, personal beliefs, values and expectations all play an important role as it helps to influence the population and win their support. However, an understanding of the enemy, its history and culture has always been recognised as a key factor in any military success (Murray mentions this in his work reinforcing his thinking by stating the position of Sun Tsu[7] (Murray, Williamson 2011b, p. 25), but it is even more crucial now since winning the battle over mind of the population is not possible without this knowledge. The second distinction between 'big wars' and modern wars relates to the fact that the enemy seeks and utilises 'non-traditional' ways of fighting (e.g.,

[7] "Sunzi, Wade-Giles romanization Sun-tzu, also spelled Sun Tzu, personal name Sun Wu (flourished 5th century bc), reputed author of the Chinese classic Bingfa (The Art of War), the earliest known treatise on war and military science.
Sunzi, a military strategist and general who served the state of Wu near the end of the Spring and Autumn Period (770–476 bc), is traditionally considered the author of The Art of War, but the work is more likely to have been written early in the Warring States period (475–221 bc), at a time when China was divided into six or seven states that often resorted to war with each other in their struggles for supremacy"(Ed. n.d.-b).

terrorist attacks, insurgency, etc.). This helps an adversary to avoid the usual direct fight against almost unbeatable Western military forces, but still allows them to maintain a positive position by continuously seeking ways to take advantage of the imperfections of modern Western military forces and enhance their own influence on the local population. In general there is no enemy sufficiently well organised to mirror these Western capabilities and follow the conventional rules of war. This makes a war being conducted at a shadow ideological level, with military forces only to support it. Thirdly, an adversary is more likely to operate in urban environments, creating difficulties for the modern army to make efficient use of their military equipment and capabilities. An urban terrain is unusual by its very nature for many armies, but it further complicates warfare by its proximity to civilians and the high risk of casualties among them resulting from combat. Moreover, fighting on an enemy's territory means lacking knowledge of the terrain itself, while the enemy uses this as an advantage. This fact also makes irregular warfare differ from those being fought in the 20th century: an unknown terrain complicated by the presence of a local civilian population expands possible scenarios of war that modern armies should be prepared for – and opposes notions of conventional warfare that deal with a well-known enemy and well-known areas of possible military action (refer to the LTGEN Barno description of the Cold War period that is provided several pages above). Fourthly, communication technologies have opened up an opportunity for the enemy to create a worldwide web of agents transferring war to a global arena, seeking more financial support from different sources and providing easy access to weapons. Interconnectedness can also be observed between different (friendly) countries that cannot now operate in isolation pursuing personal goals, but need to take into account the interests of other countries that work together in both political and economic areas. This fact has advantages and disadvantages as it can strengthen the position

of a friendly country or create obstacles for effective action. Moreover, communication technologies (including, internet, social networks and mass media) transform war into a global business simplifying the diffusion of ideological ideas and making it possible for people all over the world to influence its course.

An advantage can be obtained by the enemy to influence people's attitudes through the use of the mass media and social networking. The interconnectedness of different countries, processes and people is a distinctive feature of the Information Era. Of course this fact shapes modern operational conditions making wars global events rather than localised areas of conflict; thus, we are not only influenced by the fact of the presence of hot spots, but heavily affected by the course of these local wars as well as their outcomes. Finally, modern warfare is a long-term on going event with a continuously changing face where time itself can be used as a component of war making. Figure 4 illustrates summative comparison of regular versus irregular warfare.

Summarising the conditions of the modern operational environment it is possible to see that warfare has changed from a 'big war' concept to a different type of smaller-scale operation that utilises irregular ways of fighting and avoids face-to-face confrontation to diminish the advantages of modern military forces. The main focus is on the local population with a purpose to gain its support and have control over it. New technologies have shifted warfare to the global arena and opened up new opportunities for the enemy. This shift towards irregular warfare is an adaptive reaction to changes in the global security condition that was, first of all, initiated by an enemy finding itself less trained and equipped in the conventional military sense, but who has managed to discover new ways of overcoming these

deficiencies. These circumstances have created a need for adaptation that is now facing by modern military organisations.

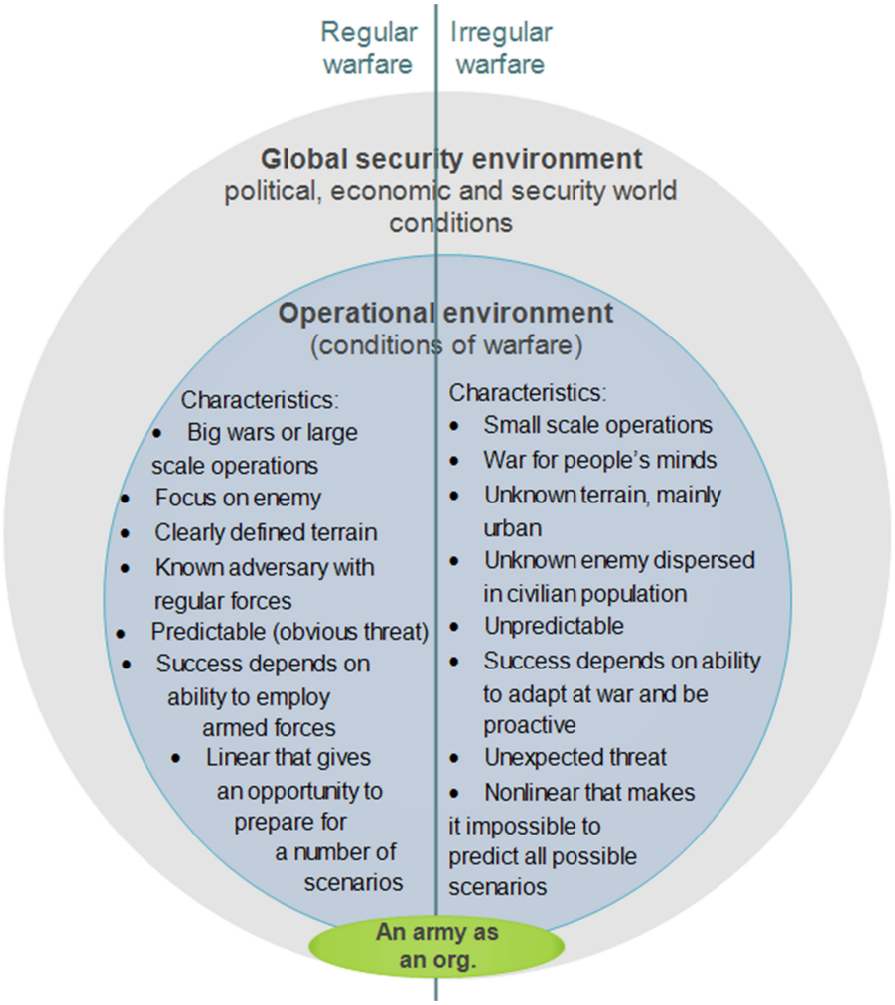

Figure 4. Operational environment (conventional vs complex)[8]

The need for adaptation is dictated by the conditions of global security and operational environments both of which present external complexity for military organisations. However, this is not the only challenge military forces face on if they are to adapt. Organisationally and structurally, an army is a complex entity with its own habits and behaviour. Moreover, it is a social organisation that involves people. Thus, the organisational structure and processes and the socio-cultural dimensions are another side of the coin that

[8] Based on (*Marines and Irregular Warfare* 2012)

complicates an organisational change process. We review these aspects in the chapter below.

2.1.2. Internal characteristics – a military organisation

Linearity, specialization, decomposition and hierarchy describe military organisations of the 20th century. These characteristics might also relate to other business-orientated organisations although this is not the focus of the thesis. Below we discuss the general characteristics of military organisations and their impact on organisational adaptability. We review a military organisation from different perspectives – starting with the classical Weberian bureaucracy, command-and-control (C2) structure, process of planning, and finishing with the concept of an agile entity at its extreme known as an *Edge Organisation* (Alberts & Hayes 2003). This represents a spectrum of thought on military organisations and helps us to highlight their internal complexity. We also pay special attention to the socio-cultural domain and underline its importance in efficient organisational work, military operations and organisational adaptability in general.

2.1.2.1. Structural-functional perspective

We implicitly utilise the concept of ***systems theory*** that is based on a conscious organisation that closely mirrors the ideal-type construct of a whole society, and termed structural-functional theory. It was widely popular in macro-sociology and related social behaviour disciplines during the 1950s and 60s. This section looks at two parts of this systems theory – technical functions and managerial functions. We will discuss the institutional function in a separate section where the socio-cultural aspects of a military organisation will be examined.

When technical functions are mentioned we means ways and means of transforming organisational goals, visions and strategies into work processes that involve people and other technologies, while managerial functions concern administration and coordination of organisational parts (Elsey 1997). In this section military organisations are viewed from a Systems Theory perspective allowing for an abstract representation of their functions and structure. We move from one extreme to another – from a mechanical organisation that mirrors classic bureaucracy with a traditional command and control structure (C2) to an organic type organisation that is agile in relation to required responses. We discuss these two extremes to demonstrate the traditional organisational properties as well as those that are needed for efficient operations in modern environment. We attempt to demonstrate that military organisations need to adopt both models, mechanical and organic (Figure 5). The first is to maintain a coherent organisational order that is structured and predictable for everyday purpose. The second is designed to deal with combat complexity and the dynamic nature of the global security environment in general.

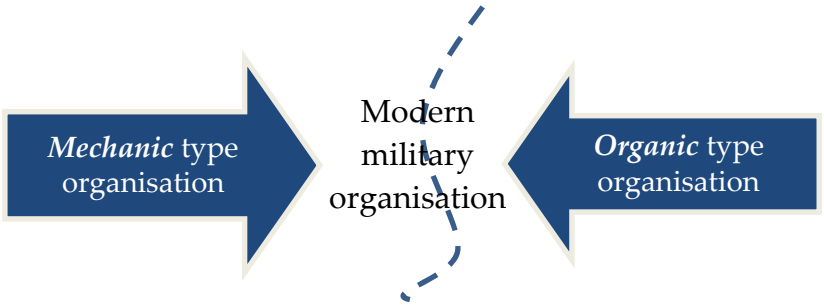

Figure 5. Military Organisation – mechanic vs organic

It is logical to start with *Weber's bureaucracy* since any discussion about organisations and militaries in particular begin here. This is an extreme view, that perceives organisations as machine-like entities, based on precise calculations of any type of relationships including the ones among men

(Miewald 1970). Weber's bureaucracy is a classical view of the Industrial era that believed that the effectiveness of an organisation fully depended on management. This *"ultimate in bureaucratization"* form relates not only to management of an organisation, but also states that *"even warfare had been caught up in the irresistible advance of rationalization"* (Miewald 1970). Weber's bureaucracy ignores individual ability or the possibility of human beings to have any impact on the work of an organisation – on the contrary, it reinforces discipline and compliance with the rules that allows leaders to plan and increase their confidence in the expected outcomes (Miewald 1970; Ryan, Michael 2005). There were similar ideas developed at the same time, the Industrial Era: *scientific management* and *administrative theory*. Scientific management is focused on efficient organisation of work of individuals and machines; Frederick W. Taylor is reputed to be the 'father of scientific management'. Administrative theory is the managerial side of organisations that are based of the principals that are used to develop and manage organisations (Tosi 2009). One of the most influential writers in this field is the French engineer Henri Fayol, who *"believed that his concept of management was universally applicable to every type of organization"* (Shafritz, Ott & Jang 2005). All three approaches represent an extreme view of an organisation. The question then is, in what form can it be found in modern military operations? We will discuss this later.

There is another topic that is also relevant to the discussion of military organisations – command and control (C2). This term covers a set of principles to utilise resources, plan and organise personnel in order to achieve desired outcomes of a mission[9]. C2 can be applied to any

[9] A widely used description of command and control: "The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission..." (*Dictionary of Military and Associated Terms: Joint Publications 1-02* 2016)

organisational level – strategic, operational, tactical; it also covers four different domains – physical, information, cognitive, and social (Alberts & Hayes 2003, p. 14). Irrespective of what C2 approach is used in a particular organisation or situation – it represents principles of responsibility, authority and accountability being used to achieve success. While it is argued that the success of the C2 does not require a hierarchical structure in an organisation (Alberts & Hayes 2006, p. 9), a traditional application of the C2 concept implies a top-down approach, where *"commanders are "in control" of their subordinates, and subordinates are "under the control" of their commanders"* ('The Nature of Command and Control' n.d.). This top-down approach places information in the hands of commander, slows its distribution and creates a stove-piped pattern in its dissemination. In reality being responsible for the situation, a commander only has a limited possibility to control that situation; this is due to the inherent complexity of war and human factors that reveal themselves in battle. Thus, the art of command and control depends on the ability of a commander to lead an organisation in constantly changing conditions and uncertainty.

C2 has an obvious correlation with Weber's bureaucracy as they both (one to some extent, and another fully) rely on a possibility to plan in advance utilising the known properties of its organisational parts and an understanding of their interconnections. This fact is true of many areas of organisational life. However, the clearest example is the planning process that is one of the functions of C2 and Weber's bureaucracy. It is described as the "immediate planning process – *"situation based planning for the likely or certain"* for many similar military forces such as the US, NATO, Canada and Australia (Kalloniatis & Macleod 2010). Moreover, an assumption of predictability of actions and a situation in general uses business processes where *"ordered discrete non-decomposable tasks are essentially linear"* (Kalloniatis

& Macleod 2010). It should be acknowledged that there is still evidence that the process of military planning attempts to cover internal complexity allowing an organisation to respond to external conditions respectively, e.g., aggregating complexity of human behaviour in manageable chunks and applying different structures for different types of planning (Kalloniatis & Macleod 2010).

To move forward we will discuss the implications of Weber's bureaucracy and C2 on military organisations, and the complications they add to military organisations. To do so we utilise the concept of *Edge Organization* (Alberts & Hayes 2003). *Edge Organization* is an opposite extreme to the totality of Weber's bureaucracy, it is argued to be an approach more suitable for the conditions in the Information Era. It is not a goal of this section to reinforce or argue this statement; the concept of *Edge Organization* is used to contrast the properties of military organisations that are mainly based on traditional ways of management. It aims to demonstrate obstacles to such existing classical approaches (such as Weber's bureaucracy and traditional C2) that are created for a military organisation in modern times.

Reflection of thoughts similar to Weber's bureaucracy can be still found in modern military forces. A linear approach to management utilised in the Industrial Era resulted is a straight-forward break down of tasks into simple, easily understandable and manageable parts. This is an example of machine-like thinking, where each part of an organisation conducts its own task and can be understood and controlled independently of the whole system. In this way a sum of all parts can be shown to represent the whole work an organisation is supposed to perform. Examples of this decomposition in military organisations are the divisions of services (air, land and sea) and further distributions of functions (logistics, intelligence, personnel, etc.) (Alberts & Hayes 2003, pp. 38-39). This decomposition in turn allows each

separate part to specialise in a particular function with the further possibility to master it. The positive side of specialization is very strong as it allows an organisation to advance knowledge and skills in specific areas; this fact is crucial in a military force as it is allowed to develop specialized capabilities that are important in many military operations. A machine-like entity needs to be controlled and directed towards desired goals. That is done through layers of management that create an organisational hierarchy. The information flows from one divisional line of specialization to another that focuses the efforts of its organisational parts to particular tasks. Teams, squads, platoons, companies, battalions, brigades, divisions, corps, armies are examples of organisational hierarchy (Alberts & Hayes 2003, pp. 42-43). High levels of specialization lead to a belief that it is possible to generate the best solution for any issue. This implies a clear statement of an issue and the conditions of work required to fix a specific problem. Specialization, hierarchies and their span of control as well as a search for the best solution (optimization) separate organisational parts allowing them to work even more independently within well-known conditions. Such ideal conditions of work make it possible to achieve greater results within specialised areas of an organisation without unnecessary interference with other organisational parts (deconfliction). Finally, a strong belief in managerial knowledge, skills and ability to plan combined with the perception of an organisation as a mechanical entity leads to a centralised planning approach; this incorporates overall knowledge of organisational capabilities and goals and results in the development of a comprehensive strategic plan for the whole organisation as well as smaller plans for its separate parts. The implications of a machine-like entity approach have positive aspects but reality dictates its own rules that will reveal the negative aspects of such organisational principles. They are described below.

Ideas of decomposition, specialization, hierarchy, optimization, deconfliction and centralised planning sound very reasonable and attractive to those who are in charge of leading military organisations since they provide a structured approach to management. However, the reverse side of the coin undercovers limitations of such an approach. It concerns the attempt to reduce the complexity of military organisations and the uncertainty of war. The division of a bigger task into a set of smaller ones allows leaders to feel confidence in managing the whole organisation through its individual parts. However, this leads to the following consequences. First of all, the principle of decomposition, specialization and deconfliction divide organisational parts and make them independent to such a degree that they struggle to operate efficiently with each other. In other words there is a problem of generating effective cooperation because to synchronise these semi-dependent organisational parts, having their own interests, is no easy task. Second, a hierarchy prevents a free flow of information and limits the availability of information to a wider audience. Information is perceived as power (if you know more than others). Moreover, information moves up and down the lines of its organisational parts creating a stove-piping effect and increasing probability of *"error and distortion"* as information can be interpreted differently (Alberts & Hayes 2003, p. 43). Finally, the planning process (as mentioned before) is a linear way of preparing for the future, where potential future threats are assumed to be known. This threat-based planning prevents military forces from being agile in the face of unexpected wartime conditions. Plans themselves are cumbersome documents prepared by high level headquarters who try to match their organisational capabilities with a set of potential strategic tasks and threats. It is still possible to see the high level of trust such management bears on its broad shoulders. This model of organisation can work perfectly in a stable and predictable environment, but it faces many obstacles in the current military environment.

While it is not a simple task to design military organisations for modern times, *Edge organization* concept attempts to provide general principles for that purpose. We use them here to demonstrate the impact they may have on the thinking of today's military organisational life (Figure 6):

- It is necessary to get to the root of the issue and redefine aspects of organisational culture (e.g., values and behaviour) including more practical details of relationships between organisational elements and processes.
- This also relates to leadership which should empower people in a particular situation rather than dictate solutions for its implementation.
- An organisational structure should reflect the nature of work and have a network topology that allows the allocation of situation-based roles that provide easy access to required resources.
- It is necessary to move from the belief that 'information is power' to a state where information is openly shared across a range of people who might be interested and can benefit from it; by virtue of new technologies this task is not as difficult as it would seem but rather relates to the way the system of information sharing is designed (considering organisational culture supports and encourage information sharing).
- A new approach to C2 that has resulted from the changes introduced in information sharing and the empowering people.
- New conditions of work that should allow for interconnectedness and interoperability for more efficient work within a single military force as well as within bigger coalitions.

This is not a prescribed solution for organisational change but rather a signpost that should guide a military force desiring to reflect the needs of modern requirements. What they show is the need for change that would lead to a transformation of the traditional, cumbersome, slow and blinkered

military organisation to a modern highly adaptable and efficient force of the future.

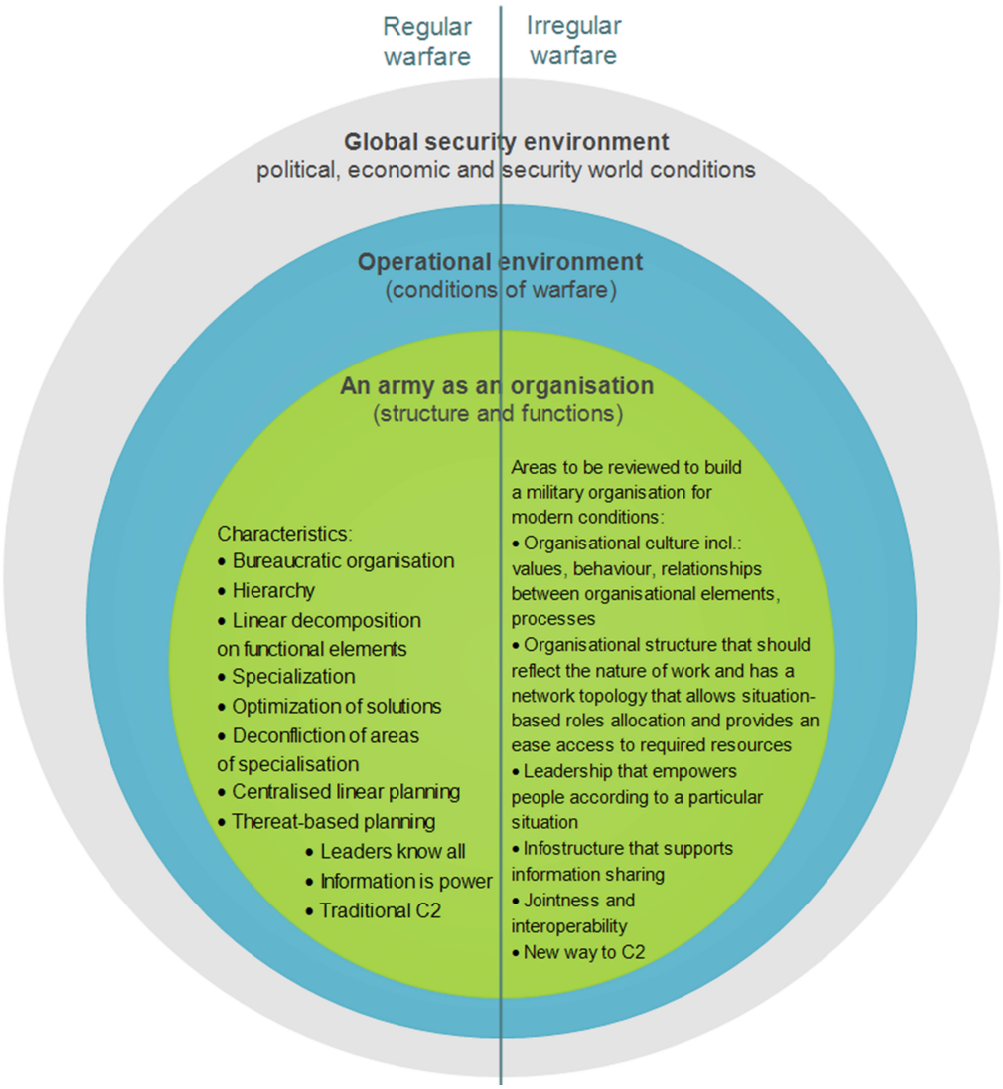

Figure 6. A military organisation

An *Edge organization* concept is not the only available view on what future militaries should look like. Another clear example of this progressive thinking is presented in '*Team of Teams*' book (McChrystal 2015). Authors provide examples of the experience of the US Special Forces in Afghanistan and Iraq. More than that, the book contains examples from business organisations – all together allowing authors to compare and confirm their findings available from recent military engagements. The synthesis of all these findings marks out four main areas of attention that one should pay to

develop a modern organisation. Starting from the imperative to change and adapt it shows the drastic change in the current global environment (political, economic, social or all together). These changes are so big that it is impossible to apply current structures and methods of management (mainly based on the benefits of the Industrial revolution). Thus, the real-life experience of Special Forces demonstrates the necessity to reorganise their thinking from hierarchies, orders and power of information to a new way of directing organisations. Such a transformation moves organisations from rigid command-and-control relationships to networked-based communications. It is possible through developing and reinforcing "*trust* and *common purpose* that bond small effective teams, and dispel the fallacy that it takes Superman to forge super teams". Then it requires the building of *shared consciousness* that is "the way transparency and communication can be used in an organization to produce extraordinary outcomes across even large groups". Finally those above should be supported by *empowered execution* that will be "pushing decision making and ownership to the right level for every action" (McChrystal 2015). All the above resonates well with the ideas of *Edge Organization* and touches domains of organisational culture, information sharing and leadership. It also connects with the socio-cultural aspects of organisations that are discussed later.

In conclusion, it is unfortunate for a modern military organisation operating in a dynamic and complex environment, to have properties that limit its adaptation. Therefore, the military literature is full of discussions that reinforce the need for military organisations to change in order to be able to respond effectively in a new operational environment. Two examples will follow shortly. The *Edge Organization* and *Team of Teams* are only two concept that states the importance of a move towards a more organic-type organisation. However, there is evidence that military forces striving for

greater agility will remain hierarchical and process driven (Kalloniatis & Macleod 2010). Thus, as was mentioned before, military forces require a solution that would merge two concepts together: a *mechanistic* one to maintain a coherent organisational order for predictable everyday work, and *organic* to deal with dynamic and complex nature of a modern operational environment. It is likely that these traditional characteristics are still unavoidable, even if the principles of work may change. Moreover, for the current time when military organisations still mainly operate within an outdated Industrial Era paradigm, we would like to underline that traditional organisational characteristics remain a part of the problem of organisational adaptation and need to be dealt with.

2.1.2.2. Socio-cultural perspective

Military forces represent a clear example of an organised form of a social system, comprising of human beings rather than natural organisms. It is a purposeful and goal-directed organisation with a formal structure of rules, norms and values which all ranks from senior generals through to the private soldier follow through a code of authority relationships, command and control mechanisms, underpinned by enforceable military discipline and laws. The entire organisation is regarded as a system by those that belong to it, with a clear boundary separating its members from the 'outside world' of civilians, while still accountable to external political control and the laws of a wider society. The system decides on its own codes of conduct, allocates roles and tasks in a complicated division of labour, all designed and intended to demonstrate capability and 'fit for purpose' operational behaviour should it be called upon for various kinds of military engagement, with warfare being its ultimate expression of purpose and performance.

Modern professional military forces are usually sophisticated in the application of the tools of technology designed for military engagement. But they are more than their hardware, for they are held together by an elaborate military culture where the mindset of a modern soldier is trained to think and act in particular ways, ranging from the skills of survival through to knowledge and belief in its mission and purpose in complex and challenging environments. This further extends the application of systems theory in this thesis to a concept of sociotechnical systems (STS)[10]. STS theory explicitly differentiates two *"substantive factors – the people and the equipment"* (tools and technology) and seeks for a right balance between machinery and human beings for greater organisational effectiveness – joint optimization (Trist 1981). STS concept underlines the relationships between people and technology that may be of different types – linear (those that are designed and can be predicted) and non-linear (those that are happen in an unexpected way despite their predefined rules of behaviour) (Walker et al. 2007). Military organisations are example of highly technical system that utilises different equipment and platforms to conduct their activities; however, a technical base itself is nothing without people. To effectively link personnel and equipment together, relationships between them need to be regulated through rules, procedures and organisational processes – linear relationships. By introducing a social domain to the systems concepts STS highlights the fact that a system is operated by people who cannot be easily managed in a machine-like fashion as there are other factors that influence the effectiveness of work. These factors are not tangible and relate to the social and even psychological areas of human behaviour that constitute an organisation. Informal networks of information sharing and ranks within a

[10] Sociotechnical systems can be described as "[w]ork organizations [that] exist to do work – which involves people using technological artifacts (whether hard or soft) to carry out sets of tasks related to specified overall purposes" (Trist 1981, p. 10)

grade-class system are examples of the social nonlinear relationships among military personnel. Thus, the task of optimising a joint effort of the technical and human parts of a military organisation contains more non-linear, qualitative, hardly measurable social variables than can be perceived at the first glance.

Through the examination of organisation theory it is possible to see that the role of people in an organisation, even more their impact on overall effectiveness, is a never-ending story of discoveries contained within the 20th century. Two studies, Hawthorne[11] and Tavistock[12], showed previously unknown aspects of organisations such as the influence of various factors on workers' motivation. This added a social dimension to the management of organisations and transformed the traditional beliefs in organisational management by adding a degree of complexity and nonlinearity to the workers behaviour (previously perceived as completely linear and planned). The model of management that is still employed in the majority of modern organisations gives power to managers who are responsible for its organisational success and effectiveness. However, there is no denying that people play a critical role in the effectiveness of an organisation.

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[11] The Hawthorne studies that were conducted in the Western Electric company in Chicago, where researcher Mayo with his colleagues tried applied the best traditions of the scientific management in their attempt to explain issues of productivity and their various factors of work. Findings of the Hawthorne studies showed that besides technical factors (illuminance, physical conditions of work, etc.) there are other factors that influence workers effectiveness. These factors concerns concern people and their motivation. While the power still belonged to the management, it had become obvious that humans also play a great role on organisational work.

[12] The Tavistock study by Elliott Jaques, (1917-2003), "Canadian-born psychologist and social analyst who , developed the concept of corporate culture and coined the term mid-life crisis. In 1946 Jaques became a founding member of London's Tavistock Institute of Human Relations. In 1952 he began an association with Glacier Metal, where he developed his theory of time frames and requisite organization. He believed that different individuals were capable of carrying out tasks in a variety of time frames and that organizations should be arranged hierarchically on the basis of these time-frame capabilities—that is, employees who were capable of carrying out the long-range tasks should be at the top of the hierarchy"(Ed. n.d.-a).

Professional military forces are based on free will and the commitment of soldiers to follow rules. However, such aspects as organisational culture and leadership play a crucial role in building right conditions for organisational effectiveness and adaptability. The concept of organisational culture is a product of the mid-20th century and is linked with the discovery of the social domain. In the Industrial Era, organisational culture was perceived as an instrument of management to improve organisational effectiveness (Boonstra 2013, p. 1). However, the culture is more than a management tool – it is an integral element of an organisation that is *"inextricably connected to everything that an organization stands by and goes for … [and] consists of stable fundamental assumptions about human cooperation, mutual relations and the relation between organization and surroundings"* (Boonstra 2013, p. 1). Surrounded by a number of academic debates the concept of organisational culture is difficult to define; various approaches discuss such aspects of organisational culture as values, beliefs, principles, and even symbols, rituals, language, heroes and stories. From an organisational change perspective culture is something that is stable and hard to change (Boonstra 2013, p. 20). Thus, it takes vision and leadership to transcend and transform a system that can readily become outdated and rigid, the classic dysfunction of a bureaucratic human machine that serves itself rather than current circumstances. In the literature on leadership, in turn, provides a number of different styles that vary from organisation to organisation and even from country to country (Northouse 2009). However, emerging types of leadership (such as complexity leadership) demonstrate increased interest in an ability of an organisation to deal with the dynamic and emergent change by bringing ideas of CAS to the management style (Uhl-Bien & Marion 2009). Right forms of organisational culture and leadership, those that are connected with the environment in which they exist, are conditions for organisational success. Moreover, *"culture and leadership … are two sides of the same coin"* – one cannot exist and

evolve without another making the essence of its associate meaningful and important (according to Schein a property that is *"uniquely associated with leadership—the creation and management of culture"* (Schein 2004)). Both concepts have human beings and their interactions at their core.

It is not true to say that military forces ignore their social aspect. A recent study in strategic leadership is one example of interest in determining the crucial characteristics of a leader (Jans et al. 2013). Deviations in personnel were included in the process of planning and analysis through the approximation and aggregation of human creativity while considering other possible ways of behaviour (Kalloniatis & Macleod 2010). This still mirrors a machine-like approach for managing an organisation. A more radical approach to consider human factors is explained in the *Edge Organization* concept that gives a special role to people and suggests to move them to from an area of approximation and planning to a position of being active participants and contributors in the organisational life (providing power to the 'edge' where edge is people who conduct everyday activities (Alberts & Hayes 2003)). Principles of the *Edge Organization* described above reinforce the importance of organisational culture and leadership. This idea is dictated by the conditions of the modern operational environment and the era of new technologies. In general this is a new approach to management as it puts trust on people themselves and shares the responsibility for organisational success and its effectiveness among them. However, this quite radical approach offered by the *Edge Organization* in turn may result in resistance from management who usually are reluctant to let go of power and control – examples of the Tavistock Studies on sociotechnical systems provide a good

illustration of that[13]. One could argue that military history has always provided examples of giving power to the local commanders, in the belief that the principles of transferring power to hierarchical levels should be embedded within an organisational culture rather than simply dictated by the limitations of operational conditions.

Summarising all the above it is possible to say that whatever approach is taken to deal with people, military organisations, like any other, will face an unexpected task of managing the complexity associated with the social aspect of organisational life. Moreover, the need for fast information sharing among people requires empowering personnel along all lines and levels of the organisational hierarchy thus increasing the importance of the social aspect of organisations.

2.2. Need for adaptation

It is acknowledged that warfare itself is a complex endeavour and that all wars have a similar nature. However, we intend to show here that there is a difference between the operational conditions of the 20th and 21st centuries that are driven by a number of factors including shifts in political balance, the development and diffusion of new technologies, and the high speed of urbanisation. Thus, warfare still remains complex, but shifts into the global arena leading to changes in war making methods, while technologies of the 21st century give an opportunity to use some means of warfare more effectively than others. As a result, irregular warfare dominates the 21st century. It is a dynamic event, with constantly changing rules of the game and many actors are involved in it. It is hard to predict and precisely plan for a modern war, something that makes obvious the need for military

[13] Dr Jaques, who conducted study in Glacier Metal Company, recommended to take into account social forces to manage organisation. These principles were ignored by the management.

organisations to understand and accept new conditions in an operational environment and prepare themselves to be able to adapt effectively to the continuously changing character of warfare. The conventional system of military planning and preparation is based on a number of assumptions that neglect some crucial characteristics of irregular warfare, such as dynamics, new ways of fighting, and indirect confrontation. Being accustomed to a simplified and linear approach to warfare with a clear line of confrontation and a fight against well-known enemy on well-known terrain with defined methods of combat limits a modern military organisation in fighting an elusive enemy whose focus is more on the minds of the civilian population. It is argued here that a modern army has a strong imperative to adapt, since the planning and preparation systems that were used before cannot be applied to modern warfare. Military literature contains articles and reports that state the necessity of various parts of the defence industry to adapt themselves in response to the changing nature of warfare – the US Maritime, the US Air Force, the US Joint Operating Concept, Transformation of the US Army, the British Army are some examples of the adaptation to a new type of warfare. All of them confirm the need for adaptation and change. Examples of military adaptation at war are available for a regular reader in different books that describe real situations of fighting insurgency in the recent wars (e.g., Afghanistan and Iraq) by means of classical methods that demonstrated themselves as inappropriate in such complex and uncertain warfare (*Military Adaptation in Afghanistan* 2013; Dapin 2011; McChrystal 2015).

It is acknowledged that military organisations are social systems. Internally military organisations deal with a combination of people and technologies. Regulations of the relationships among them aim at establishing a proper means of control and management. However, the human factor is

inescapable. Any thinking about military organisations must bear in mind people and their motivations. This complicates the process of organisational adaptation since it requires values, beliefs and culture to be included in the equation.

Thus, military organisations are in a situation where continuous change is needed. The change is unpredictable and can have a different type or nature (radical or incremental, fast or slow, strategical or tactical, linear or nonlinear, etc.). There is a strong imperative for them to constantly adapt to new environmental conditions that are extremely nonlinear, dynamic and complex. Organisational adaptation calls for more than the development of new capabilities and structural change but requires a qualitative change in organisational culture, leadership and values leading to a new approach to information sharing and the empowerment of its lower organisational layers.

2.3. Changes in Military Forces

Below we demonstrate existing examples of organisational change in military forces that was initiated as a response to the shifts in recent operational conditions. We concern ourselves with militaries that work within American, British, Canadian, Australian and New Zealand coalition with special attention being paid to armies (American and British in particular[14]) as they are viewed as a front-end force that actively engages in military actions and has a direct contact with the local population. Moreover, armies are not as platform centred as other services, such as Air Force and Navy. All this creates a need and opens up an opportunity for them to change and adapt.

[14] Cases of the US and British armies are taken to demonstrate organisational change. We deliberately limit the review of existing cases of organisational adaptation to these militaries as they are represent one of the most advanced armed forces that participate in different operations.

The approach we take to discuss known cases of organisational change is descriptive. This means we provide an overview of organisational adaptation; this approach eliminates the need to discuss success and failure of the particular change of ideas being implemented. We finish this section with a description of the Australian Army and its particular change program called the Adaptive Army Initiative (AAI) that is reviewed and evaluated in this thesis as an example of organisational adaptation.

2.3.1. Known cases of change and adaptation

Without going into detail we would like to demonstrate common points of organisational change that are relevant to the US and UK armies. To do that we refer to the following change programs: *Joint Vision 2020 (Joint Vision 2020: America's Military - Preparing for Tomorrow* 2000*)* and *Army 2020 (Transforming the British Army: an Update* 2013*)* project in UK. A discussion of changes in the US and UK armies are presented using the following categories: *need* for change, planned *outcomes* of change, *process* of change (Figure 7). It is not the aim of this work to review and evaluate results of the changes in the two armies. In addition to the documents about proposed changes (*Joint Vision 2020* and *Army 2020)* we have reviewed a number of military publications that talk about the changes in the US and UK armies (Dorman 2008; Murray, Williamsom 2001); the description below is a summary of our findings.

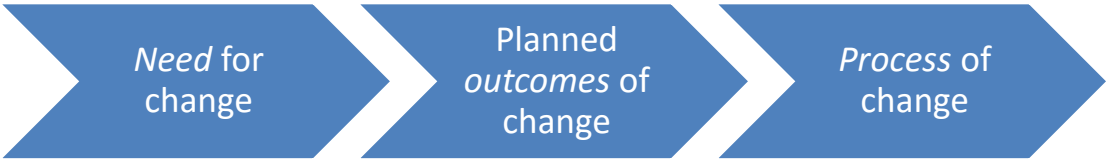

Figure 7. Organisational change overview

Need for change. The end of the Cold War left Western militaries in a position that allowed them fight effectively against any well-known threat. The

capabilities that had been developed made it possible to participate in large scale operations with the main goal being to defend their nations. In particular the US planning system was concerned with Cold War confrontation, while the UK Army recently found itself being mainly focused on stabilisation operations in Afghanistan. However, operations of the end of the 20th century – the Iraq war in 1998, Kosovo in 1999, the UN operations in Sierra Leone and Afghanistan – all revealed the necessity to be prepared for smaller scale, low-intensity expeditionary forces operating simultaneously in different roles (peacekeeping, humanitarian and others) with an aim to provide international aid rather than just defend their nation. It was realised by the US and UK armies that future theatres of war will not be limited to a number of easily predicted problematic areas around the world, but will extend to those areas that might potentially be used as a base for an enemy to develop their asymmetric capabilities (e.g., international terrorism). It was revealed that existing models of military activity were too slow and cumbersome to respond to enemy's adaptation. In addition, they uncovered deficiencies in an army's ability to deal with other organisations (incl. non-military and non-government). The attacks of the 9/11 highlighted the asymmetry of modern war and finally confirmed the need for change in military thinking. This is an even more relevant topic as recent dramatic events in France and Belgium have demonstrated[15].

Having stated this, it is necessary to say that by the beginning of the 21st century both armies (the US and UK) had gone through a series of reviews and changes in an attempt to adjust their roles to the constantly changing face in the global security environment. As one would expect both of them were continuously questioning their *'fit for purpose'* a fact documented in

[15] We refer to five simultaneous terrorist attacks in Paris conducted on the 13th November 2014 and in Brussel on the 22nd March by ISIS.

subsequent review reports and military publications. However, the intensity of operations, their differing natures, and variety of operations' types, and shocking events of 9-11 demonstrated the deficiencies and restrictions that the armies faced in implementing their traditional roles. This fact initiated the significant change process (radical rather than incremental) and forced the armies' management to admit the uncertain nature of future warfare capabilities and started on the path of continuous change and adaptation. More importantly, the implementation of these required changes was assumed essential.

Planned outcomes of change. Thus, the armies designed to confront the threats of the 20th century now noticed a misalignment between their systems and the operational environment of the 21st century. This initiated the change process with desired outcomes that can be formulated as follows. First, a significant shift was needed in the way forces were organised – a transformation from the threat-based (focused on the outright destruction or exhaustion of an enemy) to effect-based planning[16] (linking strategic and operational objectives with tactical actions and allowing planners to utilise available methods and tools to achieve desired outcomes (Dorman 2008; Mann, Endersby & Searle 2002)). Second, operations were being transformed from conventional confrontation to expeditionary ones that would allow military mobility and actions outside the country, acting pre-emptively if necessary. However, the ability to defend the country using conventional capabilities remains important and such a force has to be available when needed. Third, since the future was acknowledged to be uncertain and unpredictable the militaries needed to prepare for a range of possible operations that required skills and expertise to be embedded in the force

[16] A definition of effect is a "destruction is used to achieve effects on each of the systems the enemy organization relies on to conduct operations or exert influence—not to destroy the systems, but to prevent them from being used as the adversary desires"(Deptula 2001).

structure that makes them available at a short notice. This means that the armies need to be flexible and responsive to emergent threats in conditions of operational uncertainty and incomplete information. Fourth, a proper coordination and collaboration with various organisations (military and non-military, internal and external) create a need to develop an army that can work effectively within a joint environment (incl. appropriate urgent planning for collaborative actions together with an information interface embedded in the military system. It also requires flexible procedures and a structure that will allow it to work effectively with other services and within wider friendly organisations). This further extends the usage of advanced technologies and prolonged the need to fast and secure system of information sharing that would link friendly organisations into a web – concepts of network-enabled capability (NEC) in the UK and network centric warfare (NCW) in the US are reflections of this idea. This requires armies, as well as other organisations, to develop a system and culture to improve information sharing and speed up the decision making process. Fifth, a greater emphasis needs to put on people who operate the system and fight against enemy – their leadership skills and ability to work within the uncertainty and complexity of modern operations are key factors for effective and successful outcomes. Information availability and unpredictability give people and military leaders at all ranks more freedom to act (in accordance with the command intent and within legal rules) all of which puts more responsibility on people and reduces span of control when needed. Finally, the role of armies was changing from the nation defender to one of political tool[17]. Constant financial pressure and the necessity to support strategic directions of the government uncover the need for constant change and

[17] We acknowledge the fact that war has been always perceived as a political tool. However, military forces are just one of tools that are intensively used now in a political arena.

adaptation transforming its mechanic rigidity into flexible and agile organisation.

Process of change. The change in both the US and UK armies was acknowledged to be more radical than incremental. It concerned the structure of an army but also the way armies prepared themselves for operations and dealt with other organisations and other areas (such as training, personnel, materiel, doctrine, soldiers and leaders development). The most significant concept was to introduce the idea of restructuring and transforming armies from the division-based organisations into modular forces that would be able to re-organise themselves in accordance with the needs of current operational requirements. This approach has a number of benefits such as the development of flexible forces whose capabilities can be adjusted when needed (as well as adapting to institutional systems); it decreases preparation time and the likelihood for the enemy to predict its reactions. It also allows for the continuing introduction of more advanced technologies.

Moreover, an emphasis was made on strategic planning and its alignment with the changes in the global security environment and its implication for military operations (strategic responsiveness). One significant innovation was the introduction of a force preparation cycle (Army Force Generation in the US and Formation Operational Readiness Mechanism in UK) that allows the military to maintain forces at a high level of training through a continuum of individual and collective training that makes them available for immediate deployment. The force generation cycle makes it possible to rotate forces through phases where time is allocated to individual training, then to collective training, and finally to preparation for deployment. Another significant advantage of this process is that the changes being introduced in the armies are part of an ongoing process rather than a

'unfreeze-change-freeze' concept that typified traditional theories of organisational change.

The lack of availability of some technologies and possible (unknown) enemy adaptation prevents precise planning for the future and makes the process of army change and development evolutionary. Significantly enough, the design of this change process involves a number of research projects aimed at investigating possible ways of transformation as well as analysis of required technologies to support effective operations in the future.

Examples of changes in the US and UK armies demonstrate their attempt to adapt armed forces to a new operational environment. It started from the recognition of their deficiencies in relation to the enemy they were dealing with then. Thus, it acknowledges the necessity to develop flexible armies that will be able to effectively re-organise themselves, both operationally and systemically, into organisation that are capable of dealing with unknown future threats. These adaptable systems should be able to maintain and adjust to this continuous process of change. These are examples of the transformation of highly hierarchical, bureaucratic mechanistic organisations into those that are more flexible and organic. While the structure and relationships still reflect a classical type of organisation, this move towards a network-type organisation involves armies on larger and more complex adaptive systems.

2.3.2. Australian Army

The focus of this research is on the Australian Army and the way it has adapted to the changes in the global security environment. We use the Australian Army as a case study and apply a Conceptual Framework for Adaptation (discussed below) to appraise its particular case of adaptation. We start from the historical overview of the Australian Army. Then we move

to a particular change program being implemented in 2009 – the Adaptive Army Initiative.

2.3.2.1. Historical Overview

On the 25th April 2015, Australia celebrated 100 years since the members of the Australian Imperial Force (AIF) landed on Gallipoli with troops from New Zealand, Britain, and France (*First World War 1914–18* 1980). This was one of the main actions associated with the beginning of Australia's involvement in the First World War. Now this day, ANZAC day, is considered to be a day of remembrance for all Australian men and women who died in all wars and conflicts including peacekeeping operations. ANZAC day is a key date in Australian military history. However, Gallipoli was not the first military action the Australian armed forces took part in; a historical overview shows its participation in other contingencies such as operations in New Zealand in 1863, Sudan in 1985 and China in 1900 (Dapin 2011, p. xiv). Notwithstanding that, these operations were quite small leading to the fact that the First World War experience is assumed to be the first really accountable and active participation of the Australian armed forces in full scale warfare.

This participation in the First World War increased public awareness and enthusiasm for future military operations and as a result the Army authorities set physical standards for recruiting soldiers and developed an organisation based on the British Army traditions and procedures (*First World War 1914–18* 1980; Blaxland 2013, p. 2). Before that the Royal Navy played a leading role in defending Australia, while the local army was not a strong entity (Blaxland 2013, p. 2). The history of the Regular Army proper starts after the Vietnam War – it was *"a small, professional force with troop numbers hovering near 30 000"* (Blaxland 2013, p. 5). The idea of creating a

bigger compulsory army was not supported by society neither after the First World War in 1916 nor after the Vietnam War in 1960s. This resulted in *"developing and maintaining a smaller, purely voluntary force… focused on direct defence of Australia land, beyond that, made only carefully calibrated contributions to operations with strong international mandates and limited political risk"* (Blaxland 2013, pp. 5-6).

Since 1945 Australian *"armed forces have fought in seven wars … and never in response to a direct threat to its sovereignty"* (Dapin 2011, p. xi). Operations involving the Australian Army were perceived as ones of protecting national interest while being conducted offshore. The Army's warfare experience of the two world wars is linked to the desert, jungles and islands terrains rather than with the trench warfare that was conducted in Europe (Blaxland 2013, p. 2). This is noteworthy point to mention as it shows an opportunity the Army had had to practice extensive battlefield manoeuvres. Later wars were fought in similar terrains. Moreover, constraints the Army faced during the Second World War, e.g. operations in New Guinea in 1943-44, allowed the Army to train its ability to adapt to operational conditions through finding a creative solution using only local conditions and available equipment and personnel to achieve goals (Dapin 2011, p. xi). Advance in military experience obtained in Namibia, Cambodia, Somalia, Rwanda and other places allowed the Australian Army to successfully lead operations in East Timor and Solomon Islands and gave it a reputation as *"a politically neutral and emblematic national institution"* (Blaxland 2013, p. 7).

A significant part of the history of the Australian Army is linked with its participation in the world wars. However, global events in recent decades have involved the Australian Army in non-traditional operations and shifted a general understanding of global security and warfare. These new conditions of war also demonstrated a need for adaptation as well as

revealing the need for an increased speed of deployment and broader types of operations to cope with humanitarian, peacekeeping and natural disasters. To respond better to these non-traditional conditions of warfare the Australian Army also established Special Forces that are aimed to *"enhance Australia's ability to use non-conventional war fighting means to respond to the asymmetric threat of terrorism"* (*Special Operations Command* 2015). In this continuous battle of adaptation the Army has achieved obvious success as demonstrated by successful operations during last hundred years both as 'special' and 'conventional' components. Internally, back in Australia, the Army has a strong link to national identity that allows it to recruit candidates of high-calibre thus strengthening its capabilities. During the last decade the Army has initiated a number of significant organisational changes (such as Enhanced Land Forces, Hardened Network Army, Adaptive Army Initiatives and Plan Beersheba), to equip its functions and structure to modern environmental needs.

Looking at the Australian Army it is possible to see its obvious success in conducting its main business – defending the nation and fighting wars. Seven wars since 1945, including recent operations in Iraq and Afghanistan, have not in any way detracted from its reputation, on the contrary, the Australian Army has shown a genuine ability to adapt and enhance its reputation in any form of military engagement. Moreover, over less than one hundred years the Australian Army has managed to reorganise itself from a small infantry-centric land force into a world-class military organisation with a strong international reputation. Starting from limited self-supporting capabilities the Australian Army has mastered varying types of operations (including counter-insurgencies, disaster relief and peacekeeping) as a part of a bigger joint entity both within the Australian Defence Forces (ADF) and in cooperation with its international allies. The Army now is a professional

military organisation with a strong emphasis on individual and collective training which efficiently works with its traditional and regional allies; it is an organisation that has a very strong support and admiration among Australian citizens and offers wisely thought out services in order to maintain global security and to help those who are in need.

With clear evidence of such positive results, the Australian Army provides an interesting case for this type of research study, holding as it does a promise that can highlight the main aspects of successful organisational adaptation.

2.3.2.2. Adaptive Army Initiative

A modern army has to seek continuous improvement through regular and systemic organisational adaptation. This means thinking ahead and constructing new ways of military engagement without too much recourse to the lessons of the past. The Australian Army has participated in different kinds of operations since its intervention in East Timor in 1999; this experience showed a significant shift in the global security environment and revealed the need to prepare the Army for varying operational circumstances and make it available at short notice. Thus, in 2008 in response to changed environmental conditions, the Australian Army commenced an ambitious program, the Adaptive Army Initiative (AAI), with the aim of putting its entire organisation on an adaptive footing.

The AAI was initiated by the then Chief of Army (CA) Lieutenant General Gillespie as a review of structure and organisation to ensure that the Army had successfully adapted to the changes in the global security environment (Lieutenant General Gillespie 2008b). The review of the Army Headquarters (Army HQ) identified a number of reasons for change, i.e. the need to establish a better interface between the Army and Joint Headquarters as well

as other organisations (government and non-government), inefficient Army's practices for generating forces for operations, the need to rapidly apply lessons from other operations (especially in conditions of asymmetric warfare), and the availability of new technologies that would allow it to simplify its organisational structure (Breen 2014). Being the most significant organisational change of the Army since the Hassett reforms in 1973, the AAI aimed at modifying Functional Commands by introducing different temporal learning cycles that resulted in changes in training, personnel management, knowledge management, learning cycles and organisational culture (Lieutenant General Gillespie 2009a). In summary, the AAI resulted in over 40 separate initiatives over the following 12 months *"to ensure it remains fit for a changing environment"* and *"in place self-sustaining processes to continually review and adapt Army objectives, structures and processes as necessary to"* improve Army's outcomes in seven strategic areas[18] (Lieutenant General Gillespie 2008a; Lieutenant General Gillespie 2009b).

Thus, the main focus of the AAI was on restructuring the Army HQ and reorganising the processes of force generation[19] and force preparation[20] – that

[18] "a. Improve Army's alignment with, and capacity to inform, ADF's strategic and operational joint planning; b. Better execute force generation and preparation, in a manner that balances operational commitments and contingency planning; c. Increase the effectiveness and efficiency of training within Army through the development of the integrated ATC; d. Improve the linkage between resource inputs, collective training outputs and Army modernisation within Army's force generation and preparation continuum; e. Improve the quality and timeliness of information flows throughout Army in order to enhance Army's adaptation mechanisms at all levels; f. Improve Army's ability to deliver Warfighting concepts, future force options, learning products and capability development options, to enhance today's Army and shape the future joint land force; g. And finally, reduce the cost of ownership of materiel and minimise equipment holdings within units in favour of more robust training and maintenance pools" (Gillespie 2009b).

19 "Force generation: the process of organising, training and equipping forces for adaptive campaigning. Force generation has five major components: training, education and development of individual members of the force and the generation of a core collective training capability at prescribed levels and standards; force structure (numbers of people and composition of the force); equipment (technology, weapon systems and quantity of equipment); readiness (the ability to provide capabilities to execute an assigned mission);

led to establishing of the Forces Command (FORCOMD), a common headquarter for managing individual and collective training. FORCOMD is *"responsible for individual and collective training … [and] promised continuity and unity between the individual training base (schools and training establishments) and land force commander who would receive trained individuals and return them periodically to the training base for further skilling"* (Breen 2014). A new structure promised to provide a more effective process of managing force generation and force preparation, and resource allocation that would in turn allow for better synchronisation of efforts (individual and collective training) and speed up process of generating forces for operations. In practice this required the creation of the Army Training Continuum (ATC) that *"is structured to integrate the training needs of individuals and the collective requirements of small and large organisations" (Our future: Army Modernisation Update 2014)*. The Army restructuring incorporated the idea of developing an organisation with an in-built property of adaptability, that is to say an organisation that includes processes of continuous review and adjustment. In this manner processes of generating forces for operations include the introduction and implementation of changes required for the Army to remain '*fit for purpose*'; these changes can be drawn from the Army's experience as well as from other organisations and friendly forces. In other words, the concepts being presented by the AAI in 2009 do not remain fixed for the next decade or more – on the contrary, they can change as required.

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sustainability (the ability to maintain the assigned level of operational activity for a specified duration)" (Breen 2014).

[20] "Force preparation: the planning and execution of collective and joint training that takes a force element from the assignment start state to a level of preparation for deployment or contingencies specified by CA and CJOPS. Force preparation builds on the core foundation warfighting skills to produce force elements for specific operational and contingency circumstances. It has five components: force concentration; mission-specific training (MST) (individual and collective); equipment (specific to mission); mission rehearsal exercises (MRE)/contingency rehearsals; assessment and certification" (Breen 2014).

One of the mechanisms for change that was incorporated into the Army's processes concerned the 'lessons domain'. It was the introduction of a system of lesson collection and dissemination that would allow the Army to quickly learn from operations and apply lessons for incoming forces in rotation and other Army's spheres of activities. The Army's ability to be *"a true Learning Organisation"* is achieved through the Army Learning Environment (ALE) where *"shared, timely knowledge and flexible, learning are accepted as the norm for individuals, teams and the organisation"* (Gillespie 2009a). ALE consists of four lessons domains: operations, force preparation, force generation, and force modernisation. Every domain contains its own learning loop; thus, there are four learning loops or 'temporal adaptive cycles': an immediate learning loop (ILL), short learning loop (SLL), medium learning loop (MLL) and long learning loop (LLL) – Figure 8. All loops are thus interlinked, allowing for lessons from previous operations to be extracted, spreading them across longer-term loops – medium (individual and collective training) and long (strategic Army planning). On the other hand, each loop is independent and has its own learning requirements, learning cycle, timeframes, and learning rates; however, they all pursue the common goal which is *"maintenance of to support operations as Army's core business remains paramount" (Army lessons Policy OPS 10-1* 2010*)*. Learning loops that include all stakeholders and decision making authorities in three learning domains (SLL, MLL, LLL) comprise the Army Lessons Network (ALN) *(Army lessons Policy OPS 10-1* 2010*)* – it represents a formal process of lessons identification and dissemination in the Army. The learning cycle of each loop is based on the lessons process (Collect, Analyse, Decide and Implement) that is directed by the Army Lessons Plan. ALN is responsible for distributing lessons across functional commands; for this ALE contains a lessons management system, a database of lessons with a medium for individuals to share their own lessons

across different units within the Army and the wider ADF (*Army lessons Policy OPS 10-1* 2010).

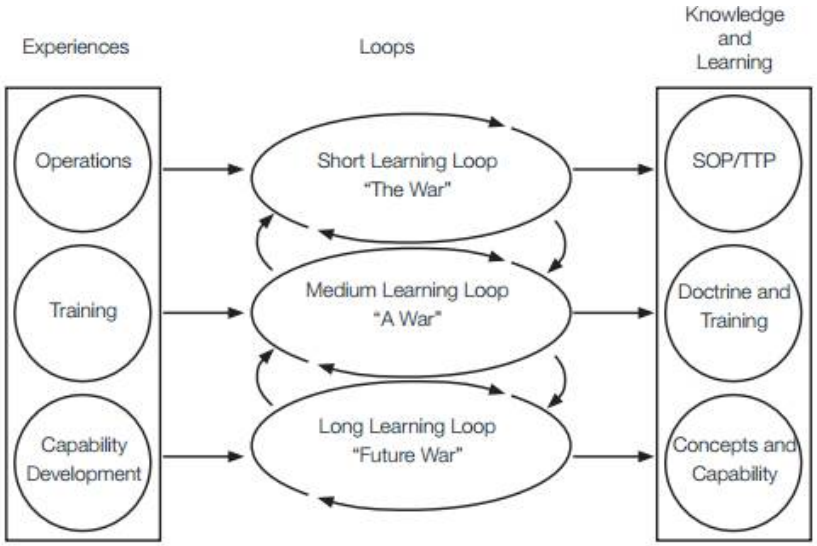

Figure 8. The Learning Loops (Breen 2014)

As was highlighted in the *Army Modernisation Update* in 2014, the *"Army places enormous importance on lessons learnt, both operationally and in the introduction of capability into service. The ability to respond and adapt to these lessons is an important part of Army's plans for meeting Government and Defence capability and corporate requirements within available resources" (Our future: Army Modernisation Update* 2014*)*. In this regard ALN represents one of the processes of organisational learning that is defined as a process for *"the review of an activity or experience to extract the lessons that enable organisations and individuals to adapt to new or changing circumstances"(Our future: Army Modernisation Update 2014)*.

As a step forward the AAI later led to the next organisational change program, called *Plan Beersheba*. It was the introduction of *'force generation*

cycle'[21] (Breen 2014) that allowed to rotate brigades through Reset, Readying and Ready phases to maintain forces at the highest level of training as well as have forces ready to deploy at any time (Figure 9). Force generation cycle opened an opportunity for different Army units to constantly train together; this is done through three 12-month phases in a 36-month cycle (*Our future: Army Modernisation Update* 2014). Another later implication of the AAI was an introduction of *"a concept similar to the US Army's modular structures"* that supports the generation of task-organised forces more effectively and rapidly for specific operating environment and contingencies (Breen 2014).

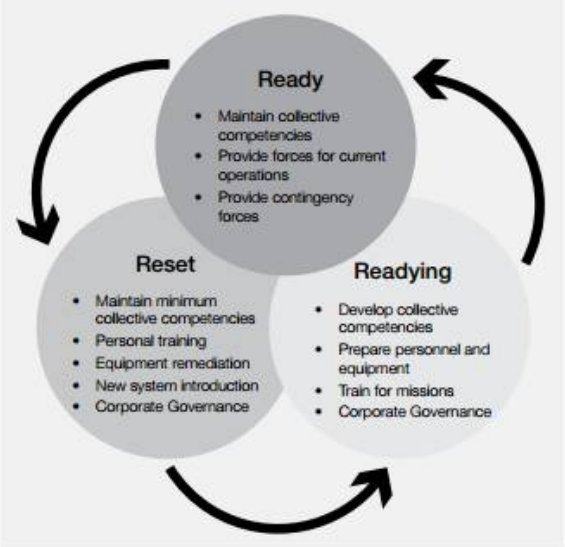

Figure 9. Force Generation Cycle (Our future: Army Modernisation Update 2014)

The current research focuses on the process of AAI design and implementation as well as reviewing ALN as a particular outcome of the AAI. Being more than a result of the AAI, ALN represents processes of

[21] The force generation cycle comprises three primary phases, known as the 'readying', 'ready' and 'reset' phases. The 'readying' phase is a 12-month period of intense training and certification to ensure that force elements are ready to deploy. In the 'ready' phase these force elements are either deployed or held at high readiness in preparation for deployment. When force elements return from an operational deployment, or conclude a period of being held at high readiness, they enter the 'reset' phase which provides time for individual training, and preparation to begin collective training once returned to the readying phase (*Plan Beersheba* 2015).

organisational learning that are crucial for adaptation. Moreover, a recent ANAO report reviewed *"The Australian Defence Force's Mechanisms for Learning from Operational Activities" (The Australian Defence Force's Mechanisms for Learning from Operational Activities 2011)* – it found that the Army has a sound process in place for learning immediate and short term (Force Preparation) lessons from its operations and has effective structures to ensure these lessons are recorded and communicated; however, it suggested that the learning loop model appears less suitable for medium (Force Generation) and longer (force modernisation) term lessons. It went on to point out that *"for these higher levels of analysis a stronger framework of measurement and evaluation would provide more robust information for decision-makers and planners" (The Australian Defence Force's Mechanisms for Learning from Operational Activities 2011)*. That reinforced an idea of appraising processes of organisational learning in ALN. The AAI covered other areas (e.g., Doctrine, Personnel and Materiel) which were linked to the major Army restructuring; however, they are not the primary focus of this research due to its limited scope. Our current research is focused on the appraisal of the design and implementation of the AAI as an umbrella for the overall organisational change in the Army and its particular objective – the Army Lessons Network.

2.4. Academic literature that explains organisational change and adaptation[22]

This section aims to link the real life conditions of an operational environment and military forces with the theories of organisational change and adaptation. We look to find a lens to examine the processes of

[22] Note: a proportion of what follows is contained in earlier writings, which I co-authored with Dr Matthew Richmond of DST Group (2016).

organisational adaptability from a theoretical point of view. With this we can examine the following theories: organisational change, complexity theory and its particular part – complex adaptive systems, organisational learning, and systems thinking (Figure 10).

Starting from the overview of the theories of organisational change we show that there is an extensive area of knowledge. However, the dynamic complexity and interconnectedness of the modern world highlights the limitations of these traditional models. Therefore, we move into the area of Complexity Theory and its particular branch – Complex Adaptive Systems (CAS). CAS promises to overcome the disadvantages of the traditional models of organisational change. Using this approach we further extend the application of systems theory in this thesis. Having introduced ideas of the complexity theory we discuss how modern military organisations can be viewed from the CAS perspective. CAS is a model used to explain modern warfare and the constant need for adaptation faced by military organisations as it pays a special attention to interconnectedness of the system's players, together with the nonlinearity and dynamism of their relationships.

CAS theory gives a special place to adaptability. Therefore, we review existing models and frameworks to appraise organisational adaptability to choose the one that better suits the current research – The Conceptual Framework for Adaptation (CFA). The CFA is chosen as it provides a descriptive model to appraise processes of organisational change and adaptability. Discussing organisational adaptability we acknowledge the importance of organisational learning in the process of change as well as reviewing it from the systems thinking perspective.

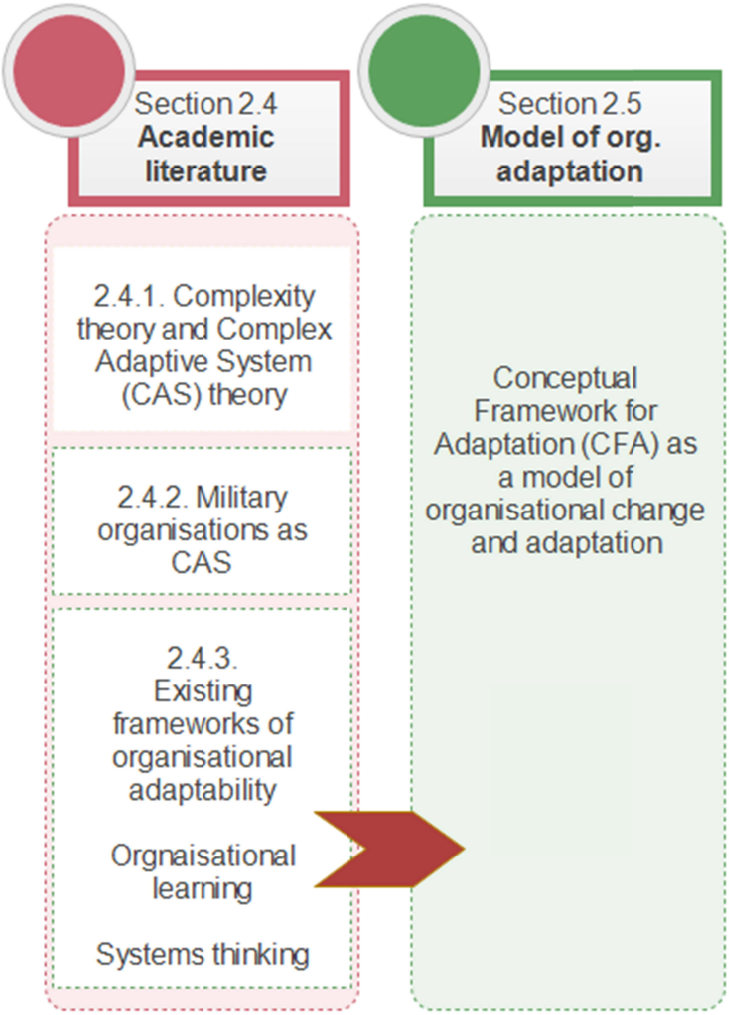

Figure 10. Structure of the academic literature review

We continue this section with a description of the known cases of organisational change and adaptation in different military forces – notably the US Army Transformation, the UK Army. However, this current research is focused on the Australian Army and its organisational change called Adaptive Army Initiative (AAI). Both the US and UK armies have been traditionally regarded as a benchmark for the Australian Army.

Finally, we look at a proposed way for the practical application of CFA. We further state that any process in an organisation can be reviewed from an adaptability perspective and by reviewing a number of processes it would be possible to develop an understanding of how they work and relate to each

other – thus, a general picture of organisational adaptation can be constructed. For that we have considered two decision-making cycles: Observe-Orient-Decide-Act (OODA) and Act-Sense-Decide-Adapt (ASDA). Starting from the OODA cycle we move to the ASDA cycle that is believed to be more proactive. We also provide a description of the other main pillar of CFA and discuss it in relation to organisational learning theory and Huber's model of information processing in particular.

Note: the literature review aims to provide a general overview of the ideas and concepts that are relevant to this research rather than discuss their advantages and disadvantages. As was mentioned before we use the metaphor of the guided walk through a landscape of ideas and concepts about the complexities of military organisations and the imperative to adapt to changing times.

2.4.1. Theories of Organisational Change and CAS

Organisational adaptation is viewed as *"an internal emergent property of organisations that facilitates successful organisational change"* and attracts greater interest (Omarova, Ireland & Gorod 2012). The literature related to organisational change is extensive and stems from several disciplines including political science, anthropology, biology, physics, psychology, as well as business and management sciences (Graetz et al. 2006; Kezar 2001). The major organisational change models can be categorised into six groups: evolutionary, lifecycle, teleological, political, social-cognitive and cultural models. These models effectively seek to characterise different aspects of the organisational system and how they relate to change mechanisms. However, how these different types of models relate to each other is often not considered due perhaps to the diversity of the discipline areas that have participated in their development. It is not the purpose of this literature

review to show differences and similarities between the various perspectives of organisational change models. On the contrary, different perspectives are used to complement, clarify or explain the development of thinking about the change in organisations. "*Organizational Change: a Synthesis*" (Demers 2008), *"Organization Theory: Challenges and Perspectives"* (McAuley, Duberley & Johnson 2007) and *"Organization Theory: Modern, Symbolic, and Postmodern Perspectives"* (Hatch & Cunliffe 2013)[23] are used as guiding frameworks to review the existing directions of thought within organisational change theory.

The developmental history of organisational change theory can be divided into three main periods: *modernist*, *neo-modernist* and *post-modernist* (Figure 11). The *modernist period* started with the idea that managers with their ability to control and organise processes in organisations play a primary role. The main approach here was to determine the appropriate order of the internal properties of organisations, which in turn would lead to an efficient operation. The *neo-modernist period* added a social dimension to organisational change and management and shifted the focus onto change from evolutionary to revolutionary. Now theorists and practitioners could observe that the environment could be unpredictable, with change occurring quickly, in unknown ways and above all, in a revolutionary manner.

[23] "Organization Theory: Modern, Symbolic, and Postmodern Perspectives" was used as complementary reading to the first two sources.

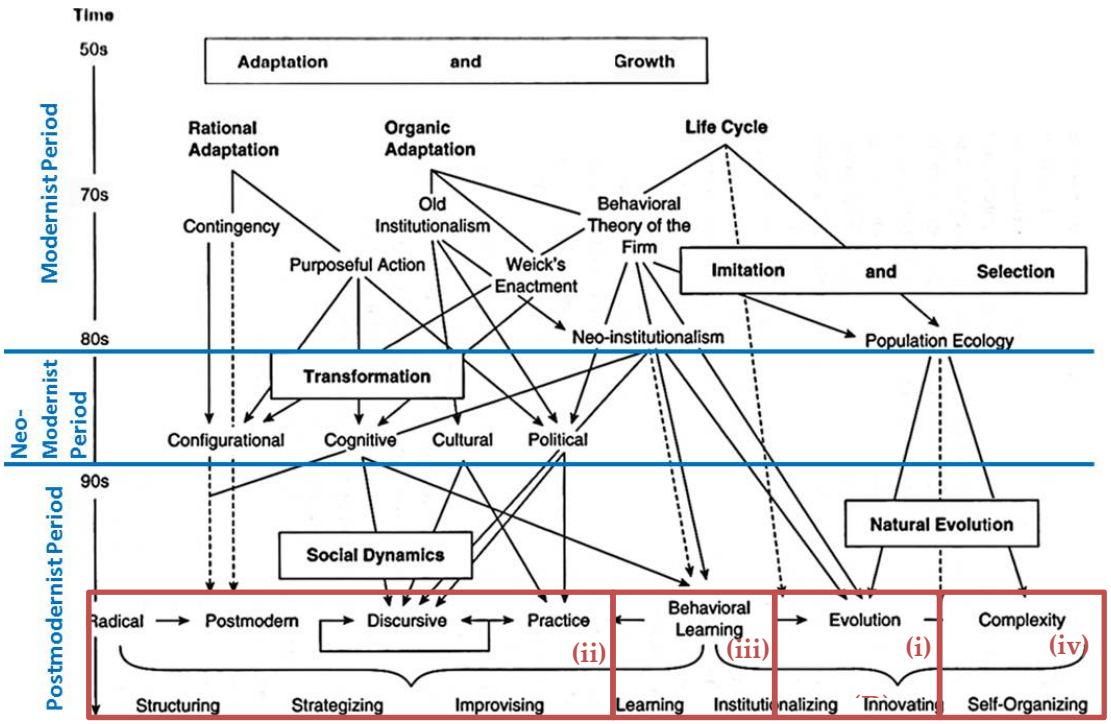

Figure 11. Main Directions of OCT. Modified Source: (Demers 2008).

Finally, the *postmodernist period* is seen as an epoch of new technologies, which has led the world to new opportunities and ways of operations. The view of change has moved from *"a concern with the management of change to an interest in increasing an organization's capacity to change"* (Demers 2008). There are four directions of organisational change theories in the postmodernist period which are based on (Figure 11): (i) the natural sciences and mathematics, (ii) social studies and humanities, (iii) organisational learning theories, and (iv) complexity theory. This current work utilises a *complexity theory* perspective that is viewed as a part of the evolutionary direction of organisational change theory development.

Practitioners working in many different fields have employed complexity theory because of the unpredictable nature of modern processes and the desire to understand a system more precisely in order to increase the final output and to reduce errors. Complexity theory is *"one of the newest trends"* (Demers 2008) and the *"concepts of complexity science have presented a way of*

better describing and understanding dynamics and processes of change found in a range of physical and biological phenomena" (Ben Ramalingam & with Toussaint Reba 2008). The inapplicability of the reductionism view, dynamic and nonlinearity – these are the main characteristics of the modern systems which have called for the application of new methods (such as complexity theory) to analyse and manage a system. In contrast to the traditional theories of organisational change, complexity theory argues that the whole is more than the sum of its parts. It promotes a holistic view of a system and recognises mutual nonlinear interconnectedness of the different system's parts. Thus complexity theory is charmed by the survival or adaptation of a system due to dynamic nonlinear internal and external properties and interactions and *"can provide a more precise definition that supports both practical application and rigorous research of this unpredictable process of organizational change"* (Eoyang, GH 2011).

Describing a system as a complex adaptive system (CAS) is one way to develop an in-depth understanding of a system from a complexity theory perspective and this approach is now widely used: markets, ant colonies, traffic systems, urban planning, airline networks, seismology, and virus research (Aritua, Smith & Bower 2009; Choi, Dooley & Rungtusanatham 2001; Grus, Crompvoets & Bregt 2010; Matthews & Thomas 2007; Pathak et al. 2007; Rupert, Rattrout & Hassas 2008; Tezcan 2006). According to Eyoang, the traditional model of management and change are based on principles of decomposition, specialization and centralization and only suitable for conditions that are internally and externally stable; these models are also characterised as "*rational, top-down, expert-driven, and planned change processes*" and based on ideas that change is driven by the management with a tight control of all processes and prediction of the results – ideas that prove themselves invalid in the conditions of the modern dynamic environment

(Olson & Eoyand 2001, p. 3). There are a number of alternative methods available to overcome the disadvantages of the traditional methods of organisational change, they all represent *"a cacophony that defines integration and does not allow any one voice to stand out as a logical alternative to the traditional explanations"* (Olson & Eoyand 2001, p. 6). CAS theory, on the contrary, provides a structured alternative method that promises to give a new way of thinking about and dealing with organisational change.

CAS theory dates back to the study of chaotic systems at the late 1980s (Dooley 1997; Grus, Crompvoets & Bregt 2010). While there is no common definition of CAS, its main properties include (Anderson 1999; Ben Ramalingam & with Toussaint Reba 2008; Cilliers 2005; DeRosa et al. 2008; Eoyang, G & Berkas 1998; Eoyang, GH 1996; Gorod et al. 2008; Grus, Crompvoets & Bregt 2010; Holland 1995; Nilsson & Darley 2006; Rotmans 2005):

- *Agents and their interdependence, diversity, rule-based behaviour and aggregation*. CAS consists of a number of agents with their own rules of behaviour. All agents are interconnected; there are different types of agents and interconnections between them. Agents can be aggregated into 'meta-agents' that act as a single entity at a higher level.
- *Nonlinearity*. CAS is inherently nonlinear, i.e. interconnections among agents are not linear. Nonlinearity and interdependence of CAS agents make the reductionist rule of representing the whole as a sum of its parts inapplicable. Thus, there are no clear cause-and-effect relations.
- *Openness and Dynamic*. CAS has no defined boundaries and constantly exchanges energy and information with its environment, i.e., both agents and their environment can influence each other making changes in CAS constant.

- *Emergence and Self-Organisation*. CAS agents have simple rules of behaviour; however, the interconnectedness of CAS agents in combination with the nonlinearity or relationships among them makes it impossible to predict a system's behaviour. As a result, unexpected patterns of behaviour can emerge through the process of the agents' interactions. This in turn can lead to the self-organisation of the system's agents into macro-scale patterns of behaviour.
- *Sensitivity to initial conditions*. CAS is very sensitive to initial conditions. Slight differences in initial conditions of two complex (similar) systems can result in moving these systems in fundamentally different directions. This fact complicates the process of predicting CAS behaviour since the experience of one CAS can hardly be applicable to the forecasting and analysis of another.
- *Adaptation* is a process that allows a system to operate in its environment through the continuous monitoring environmental conditions and adjusting system's behaviour accordingly.
- *Feedback loops* represent the ability of a system to use its own outputs to control inputs or processes. Feedback loops and the process of choosing successful variations are inherent parts of adaptation. This implies the existence of the concept of success and failure and the rules of evaluation system's results.

2.4.2. CAS and Military Organisations

Below we draw a line between CAS, modern military forces, and their operational conditions, arguing that military organisations are CAS and they operate within a bigger scale of a complex adaptive system that is warfare in a global world. This statement can be proved through the review of the military literature that compares modern warfare with CAS and confirms that they exhibit the same characteristics. A *"Land Warfare and Complexity"*

(Ilachinski 1996) report proved and demonstrated the applicability of complex science to warfare; moreover, it attempted to answer a number of practical questions to show the applicability of this new approach to understanding and influencing patterns of warfare. Without going into this work in detail, we can make use of an introductory statement from this work:

> *"Military conflicts, particularly land combat, have almost all of the key features of complex adaptive systems…: combat forces are composed of large numbers of nonlinearly interacting parts and are organized in a command and control hierarchy; local action, which often appears disordered, induces long-range order (i.e. combat is self-organized); military conflicts, by their nature, proceed far from equilibrium; military forces, in order to survive, must continually adapt to a changing combat environment; there is no master "voice" that dictates the actions of each and every combatant (i.e. battlefield action effectively proceeds according to a decentralized control); and so on. This means, in principle, that land combat ought to be amenable to precisely the same methodological course of study as any other complex adaptive system, such as the stock-market, a natural ecology or the human brain".*

This statement is further confirmed by thoughts of other authors; however, it is possible to draw a line between CAS and modern military forces through *"Planning: Complex Endeavors"* (Alberts & Hayes 2007). The application of the CAS approach to military contexts starts from the operational environment in general. This includes a description of coalition environments that consist of military and civilian organisations, government agencies, international organisations, businesses, and a variety of nongovernmental entities (Alberts & Hayes 2007) – in other words *agents and their diversity*. Every element of this coalition of environments acts differently and pursues its own goals, which impacts on economic, political and social domains, and reflects the existence and the variety of *rule-based behaviour*. Both the diversity of organisations and their interests creates a *nonlinearity* of relationships among

them and leads to an avalanche of unexpected higher-order effects that limit the ability to plan military actions using traditional methods (e.g., decomposition of plans and overall strategic planning). There is also recognition that military engagements are *sensitive to the initial circumstances*, where *"relatively small differences in initial conditions or relatively small perturbations (seemingly tactical actions) are associated with very large changes in the resulting patterns of behavior and/or strategic outcomes"* (Alberts & Hayes 2007). The characteristics of the operational environment in turn influence the requirements of modern military forces to be discussed below. It is argued that timely access to a wider range of information is important because it connects with the fact that coalition environments and their elements are *open systems* that actively source and extract information from each other. The overall complexity of the military engagements calls for an *adaptive approach* to be taken for the planning process, i.e. it should incremental and adjustable to the continuously changing conditions through constant sensing and updating the known models of the environment and its constituent parts. The CAS approach to the planning of military actions reinforces the importance of *feedback* that provides information about the impact of the implemented actions. Finally, it is argued that military structures should be designed in such a way that they allow for self-synchronization that can provide enough freedom for lower levels of organisations to act semi-autonomously in accordance with a shared awareness of the situation – an idea that is similar to natural *self-organisation* of CAS and opens up an opportunity for *emergence* to occur. Having provided a comparison of CAS and modern military environments, the concept of Network Centric Warfare (NCW) should be mentioned here. NCW is *"based upon the experiences of organizations that have successfully adapted to the changing nature of their competitive spaces in the Information Age"* and promises to cope with the dynamic nature of the environment (Alberts,

Garstka & Stein 2000). NCW represents *"the ability of geographically dispersed forces (consisting of entities) to create a high level of shared battlespace awareness that can be exploited via self-synchronization and other network-centric operations to achieve commanders' intent"* (Alberts, Garstka & Stein 2000). While NCW incorporates ideas of information sharing, its main purpose is to improve the efficiency and effectiveness of operations through the sharing of information. This will allow them to develop a better understanding of a command's intentions, support self-synchronisation without traditional orders, increase mutual awareness of situations, and develop better joint capabilities among other services and within a broader coalition (Wilson 2004). It is an example of applying CAS ideas as it includes and propagates CAS characteristics, acknowledging a number of elements and their interconnections, and promoting self-organisation; it is a concept that has evolved in response to changes in operational environments.

Practical examples confirm the applicability of CAS concepts to real life systems. The US Marine Corps was the first military organisation that recognised the benefits of applying complexity theory to describe the complexity of war (Ryan, A 2009) through Ilachinski's study mentioned above. Counter-nation networks (*"global terror groups, transnational people smuggling syndicates, regional based insurgents, and criminal patronage networks such as drug smugglers and organised crime")* possess characteristics of complex adaptive systems forcing nations to deal with enemy's systems and their networks that are able to constantly reframe themselves in an unpredictable way (Lieutenant Colonel Langford 2012). Other literature sources confirm the Clausewitzian's view that warfare is complex in its nature, but it also adds another dimension stating that it is a system that comprises of a number of semi-dependent actors that continuously change and adapt; this makes warfare complex, dynamic and adaptive (Ho, Richards & Gonsalves 2006).

There are also other known examples of the application of CAS theory in practice – case studies of complex behaviour conducted by the Australian Special Operations Task Group in Afghanistan (Captain Maher 2014).

Thus, the CAS approach provides a good way to view military forces and their settings, and helps to deal with the complexity of a modern operational environment. A CAS approach is utilised in this thesis as a means to appraise and discuss organisational change processes.

2.4.3. Organisational adaptation, organisational learning and Systems Thinking

To appraise organisational adaptability we now move to one of CAS's central properties – adaptation. For that we conducted a literature review to check existing frameworks for organisational adaptability. The Conceptual Framework for Adaptation (CFA) is chosen among others, while its detailed description is provided later. This section also discusses the importance of organisational learning in the process of organisational change and adaptation. We also demonstrate the link between current research and ideas related to systems thinking.

As was discussed above, the CAS approach to analysing complex systems reflects all of the principles of complexity theory. It facilitates the examination of a system as a whole, considering the dynamic and nonlinearity of its components and their environment and describes the notion *adaptation as an important internal property*. Adaptation is viewed as a *"familiar concept for scholars of organizational change"* (Eoyang, GH 2011). The review of the history of organisational change theory shows that the concept of adaptation can be found in the earliest stages of its development, e.g. population ecology and life-cycle approaches are based on ideas of biology with the Darwinian view on evolution at a macro level (Demers 2008).

Therefore, Evolutionary and Complexity approaches to organisational change include adaptation as a property of systems. Using the Australian Army as an exemplar this thesis examines the ability of complex organisations to adapt being one of the key properties for successful operation. Our focus is on system characteristics; however, social and cultural constraints are considered.

A number of papers have been published that analyse adaptation as a property of systems (Brown 2004; Carley 1997; Chun-Ping et al. 2007; Grisogono 2010; Gurvis & Calarco 2011; Handley & Levis 2000; Levchuk, Serfaty & Pattipati 2006; Peng 2010; Smit et al. 1999; Worley, Williams & Lawler 2014; Zhao 2009). Taking together this selective review nonetheless identifies leading ways to appraise system adaptability. It is possible to single out two directions for applying a CAS approach to appraise organisational adaptability. The first type focuses on modelling the behaviour of a particular system, while the other provides a generic description of complex dynamic systems. One of the descriptive frameworks, the Conceptual Framework for Adaptation (CFA), was developed by the Defence Science and Technology Group (DST Group) (Grisogono 2010). The CFA offers a comprehensive description of adaptation and represents a *"conceptual framework for thinking about adaptivity and about how to apply it"* (Grisogono 2005). It builds on biological evolution and CAS theories, and provides *"a generic model of adaptation, natural and hybrid types of adaptive mechanism, four classes of adaptation, five levels at which adaptation can be applied, and a discussion of the health of an adaptive mechanism, the levels of scale at which it can operate, and the factors that influence its effectiveness"* (Grisogono 2005). Moreover, the CFA includes four broad classes of changes (responsiveness, resilience, agility and flexibility) and five levels of system features (action,

capability improvement, learning-to-learn, defining success and co-adaptation).

Applying CFA to analyse organisational adaptability is to recognise the fact that modern organisations are viewed as complex systems with nonlinear interactions among its components. This stresses the importance of complexity theory, which underlines the dynamics of the modern environment and drives *"the need for new theories and tools to cope with organizational change"* (Eoyang, GH 2011). However, we should acknowledge here that there are opposing points of view that criticise incorporating aspects of complexity theory into organisational theories. They mainly question the way that complexity theory should be applied – metaphorically, analytically or prescriptively (Burnes 2005). The current application of CAS theory in this thesis is more metaphorical than prescriptive, opening up a huge opportunity for future research that will clarify these models, including the development of practical prescriptive models that are readily applicable to relevant domains.

Organisational adaptation is closely linked to the theories of *organisational learning* and *systems thinking*. Organisational learning is a *"process of change in cognition and behaviour occurring within and between organizations. Its importance to the practice of management is perhaps best captured by the view that the capacity of an organization to learn faster than its competitors may be the only sustainable competitive advantage. In addition, as environments become more turbulent, complex, and uncertain, organizations need to develop the capacity to adapt through learning"* (Crossan 2007). There are two main types of organisational learning theories that are most relevant here. Firstly, those theories that describe that learning occurs on different scales: individual, team and organisational. It is widely recognised that an organisation learns through its personnel transforming tacit into explicit knowledge. There are a number of models

which propose a process of organisational learning which is initiated by individuals, then proceeds to team,finally to an organisation level – Argyris & Schon, March & Olse, Daft & Weick, Senge, Huber, March, Watkins & Marsick, Nonaka & Takeuchi, Crossan et al, and others (Bontis, Crossan & Hulland 2002).

Secondly, there are theories that describe learning as a cycle with learning based on experiences; i.e. experiential learning models. For example, Kolb's experiential learning, Deming's cycle of plan-do-check-act, Kofman's cycle of observe-assess-design-implement and Argyris's and Schon's a discovery-intervention-production-generalization cycle of learning (Bontis, Crossan & Hulland 2002). In this thesis we utilise an approach similar to learning cycles – the one that is based on adaptive ASDA cycle (Act-Sense-Decide-Act)[24]; moreover, we aim to use an ASDA loop to appraise the organisational level of adaptability through learning. None of the traditional learning cycles (Kolb, Deming, Kofman, Argyris and Schon) attempt to build a system view of organisational learning processes, nor do they describe the necessary processes and principals that underpin organisational adaptation.

An additional perspective to organisational learning is how an organisation processes information. From this point of view, Huber's framework of organisational learning provides a good foundation for understanding and describing processes of organisational adaptation. Huber argues that "*An entity learns if, through its processing of information, the range of its potential behaviors is changed*" (Huber 1991). He divides his framework into several parts – *sensing and interpreting the environment, organisational decision-making*, *organisational learning and knowledge acquisition*, *knowledge managing*, *innovation* and *organisational culture* (Huber 2004). Huber argues that in order to survive,

[24] Note: the ASDA cycle is discussed in the next section.

an organisation should continuously change and adapt to new environmental conditions. Therefore, sensing and interpreting the environment is an important way for an organisation to track its own position and to support rigorous and rapid decision-making processes. Continuous improvement to organisational behaviour requires constant innovation; this is not possible without obtaining new knowledge through learning. Huber summarises three well-known learning models: experimental learning, vicarious learning and intelligence gathering, adding an additional model of congenital learning (Huber 1991, 2004). We utilise Huber's framework to compare and complement ideas of CFA and confirm their value.

Finally, we should mentioned *systems thinking* as an important aspect of this research. It is a concept for understanding how a system behaves, by describing its components and their inter-relationships. This is the main principle that increases the importance of reviewing a system as whole, not only its constituent parts; the principle that has as its roots General Systems Theory and is equally related to complexity and CAS theories. Conceptually, systems thinking *"has shifted from structure (reflected in the use of modularization to deal with complexity), to organization or form (accentuated in the cybernetic approaches) to the network dynamics of adaptation and transformation (within the paradigm of complex systems science)"* and the modern idea of systems thinking is based on a belief that *"systems cannot be understood by analysis – the properties of the parts can only be understood within the larger context of whole"* (Merali & Allen 2011). The implication of systems thinking on this work relates to the necessity to review processes of organisational learning and adaptation holistically, paying attention to links (recognising their non-linearity) between decomposed processes and system components, in order to represent the whole system of organisational adaptation from a systems

thinking perspective. An example of the application of systems thinking to the process of organisational learning is Senge's model of a learning organisation[25] that states that *"organizational learning is only successful when it is based on an understanding of how the whole organisational system is connected"* (Mitleton-Kelly & Ramalingam 2011).

2.5. Model of organisational adaptability

This section concerns the way to appraise such an organisational adaptation. Among the existing models of organisational change we choose the Conceptual Framework for Adaptation (CFA) as the one that provides a good descriptive model to understand a particular case of organisational adaptation (Adaptive Army Initiative by the Australian Army). Moreover, the CFA, being developed by the Defence Science and Technology Group (DST Group) in Australia, is the most familiar framework for the Australian Army that helps to review complexity of both modern warfare and military organisations. We also acknowledge (through the literature review and the CFA itself) that organisational learning plays a crucial role in the process of continuous organisational adaptation. Therefore, we demonstrate how the CFA links to the ideas of organisational learning. For this purpose we use Huber's ideas of information processing. Both models, CFA and Huber's, are examples of abstract thinking that complicates their practical application. Therefore, this part describes a step towards a practical approach to utilise these models in this research. Before proceeding to a description of the proposed model of organisational adaptation (based on the CFA and Huber's ideas), we pay attention to the ASDA decision-making cycle that is utilised as a core process of organisational adaptation.

[25] Note: *The Fifth's Discipline* by Senge is a model of the combined (gestalt) approaches to organisational learning that use various models of behavioral, cognitive and social aspects of learning.

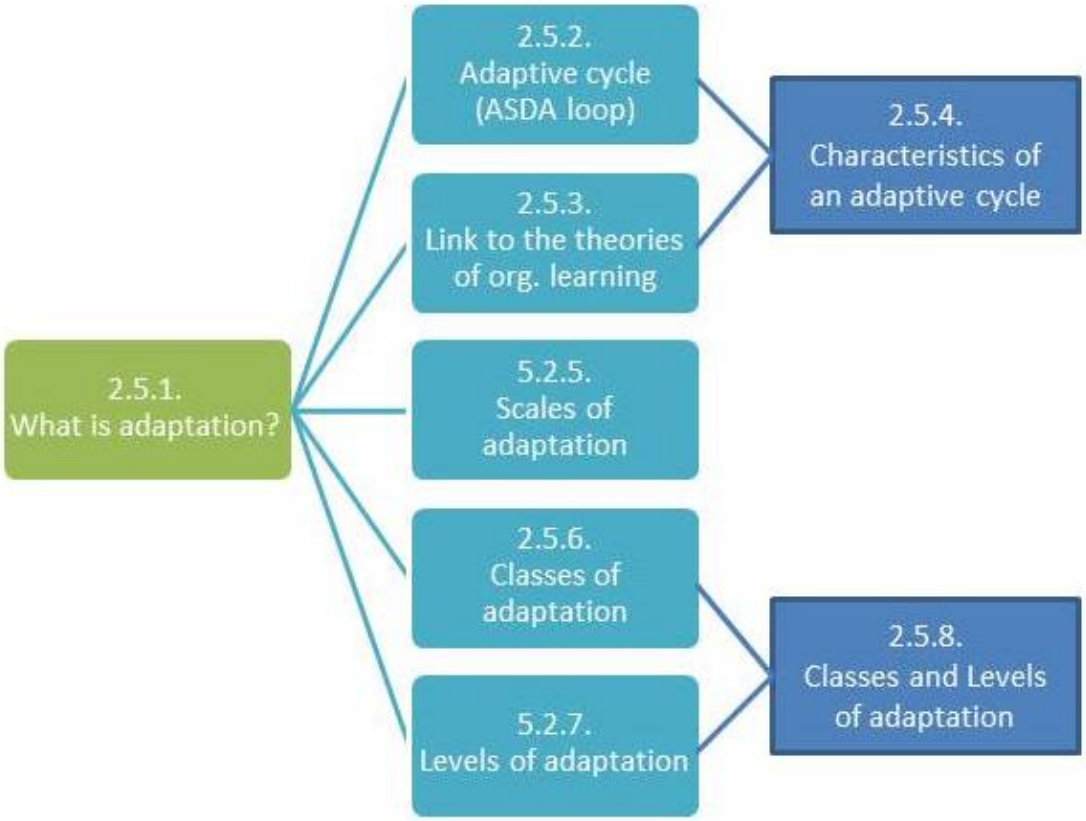

Figure 12. Description of the CFA and its practical application

A general structure of this section is based on the main areas of the CFA (Figure 12) (Grisogono 2010):

(1) **Generic model of adaptation** or Adaptive cycle or Learning cycle. The 'adaptive cycle' represents an iterative approach to continuous improvement. The adaptive cycle contains a number of subsequent steps as well as an important other aspect of adaptation which are to identify the parameters of success and failure used by a system. We consider two similar learning (decision-making) cycles – the OODA and ASDA loops. Comparisons between them show the more proactive nature of the ASDA loop that is further used as a generic model of adaptation. Here we also demonstrate links between ideas of the CFA and Huber's model of organisational learning. As a result, a list of characteristics of adaptation is developed though the description of the generic adaptive cycle.

(2) **Scales of adaptation.** Organisational-level adaptation is a combination of adaptive cycles across the whole organisation. Adaptive cycles can operate on various organisational scales (e.g., individual, team, the entire organisation). This concept is very similar to the ideas of organisational learning. The application of the CFA attempts to link learning at different organisational scales into a holistic view of organisational adaptation.

(3) **Classes of adaptation.** Another aspect of the CFA relates to possible organisational responses to an external change. Taking a 'black box' perspective, this part of the CFA uses *classes of adaptation* to identify how an organisation responds to different types of unexpected change. These changes represent the key properties of an organisation that supports the delivery of the main functions of the organisation. These *classes of adaptation* responsiveness, resilience, agility and flexibility.

(4) **Levels of adaptation** "*addresses what aspect of our system is being adaptively changed*". Depending on the success or failure of the previous adaptive cycle, a system decides what should be changed next – in some cases optimisation of exiting parameters is enough, while in others a more comprehensive action is required, such as the introduction of new capabilities or a comprehensive review of the work of a system.

Finally, we provide a theoretical model of organisational adaptability by combining aspects of the ASDA learning cycle, the Conceptual Framework for Adaptation (CFA) (Grisogono 2010) and Huber's model of organisational learning (Huber 1991, 2004). This represents a step forward towards the development a general approach to applying the CFA in practice. It should be noted that the development of a practical model of adaptation is not a trivial task and requires a number of cycles for incremental refinement. Moreover, it should be taken into account that precise instructions for organisational adaptability can limit the flexibility of the CFA model.

Therefore, the approach and methodology that are used in the research will be updated, based on experiences obtained during this research. The objectives of this work are to initiate the development of a model of organisational-level adaptability that can be used to appraise the adaptability of structures and processes within an organisation. Organisational adaptability is seen in terms of its effectiveness to support and deal with environmental changes. To avoid producing a model that lacks flexibility due to its rigid instructions, we have taken an agile approach to its development, building on action learning principles; i.e. an approach based on iterative and incremental development of the model of organisational adaptation, where requirements and solutions evolve through collaboration between analysts and stakeholders.

2.5.1. What is adaptation?

Without reproducing the whole of CFA in this work we provide the main statements from it to describe *what adaptation is*. We have not consulted other works in this regard as it is assumed that the CFA contains enough valuable information to build a proper understanding of processes of organisational adaptation that are based on ideas of evolutionary development. Adaptation is (Grisogono 2010):

- "*a capacity to generate new context-appropriate responses to new challenges*"; this might include "*developing particular capabilities which have proved their worth in the past*" while it mainly focuses on new responses for particular circumstances.
- "*To adapt means literally to improve the fit of something (the system) to something else (the environment it interacts with)".* It relates to a statement '*fit for purpose'* that is widely used in complexity theory and CAS in particular.

- Being adaptive means to learn from the experience – "*relevant information from past experience is incorporated into the system in such a way that the system's future behaviour is likely to be more effective*".
- "*adaptation is an ongoing cycle*" is a crucial statement that underlines the necessity of continuous adjusting to the environment. Adaptation does not focus just on identifying the optimal solution – it rather aims at finding out a good enough solution that opens an opportunity for further improvement (such an incremental change does not imply that the steps of change are small, but rather that they can represent a big change provided the design of the change is not the optimisation of possible solutions but rather a reasonable way to solve the issue). Moreover, the dynamics of the modern world would suggest that successful solutions from the past may no longer work today.
- A continuous attempt to improve '*fit for purpose*' in combination with its cyclical nature acknowledges the existence and importance of the *feedback mechanism* that allows it to get information about the current system's state.
- More importantly, '*fit for purpose*', cyclical nature and feedback mechanism imply the existence of a concept that allows us to test the current system state in terms of its *success and failure*. Ideas of good and bad should exist within the system to make adaptation meaningful. Parameters of success and failure are tricky things to measure since the real impact of adaptation may require time to be revealed (evolution is an example of something that can take millions of years to master the successful parameters of a given species). Therefore, the adaptation process uses 'intermediate proxies for fitness' that are "*observable outcomes which are not themselves measures of fitness, but which correlate well with it in the longer term, and importantly, can be detected over a fast enough timescale to allow an adaptive response*".

- Adaptation is seen as both reactive and proactive action that aims to respond to existing issues and identify possible threats and opportunities in order to act accordingly in the future.
- Finally, adaptation concerns *real-life experience* where it sources information before evaluating its '*fit for purpose*'.

In general, ideas of adaptation are very close to principles of organisational learning that we see as a mechanism for change. Emphasis is placed on the biological evolution that is speeded up through intellectual processes of learning. Therefore, concepts of adaptation and learning in this thesis are almost interchangeable, while some special attention is paid to specific areas of adaptation described in the CFA.

Above we provided a general overview of adaptation. However, how it works and what makes it successful is described in the sections below.

2.5.2. Generic model of adaptation or adaptive cycle

As was mentioned above, adaptability as "*a capacity to generate new context-appropriate responses to new challenges*" (Grisogono 2010) implies some kind of process that takes place to make adaptation possible. CAS theory provides a number of definitions for adaptability; however, they are all based on the same system attributes required and include (Omarova, Ireland & Gorod 2012):

- Recognition of changes in the environment.
- Information analysis and its decision-making influence on subsequent behaviour.
- Actions (changes) are undertaken to achieve a new state in the changed environment.
- A monitoring system for implemented actions to support feedback on the effectiveness of actions compared against explicitly defined expectations.

These attributes have been used to underpin further description of the process of organisational adaptation.

In general, any function in an organisation can be reviewed from an adaptability perspective and by reviewing a number of processes it would be possible to develop an understanding of how they work and relate to each other – thus, a general picture of organisational adaptation can be constructed. For the purpose of reviewing the mechanism of adaptation we have considered two decision-making cycles; OODA and ASDA.

The OODA loop (Observe-Orient-Decide-Act) was initially developed by Boyd "*to explain why American fighter pilots were more successful than their adversaries in the Korean war*" (Brehmer 2005). The OODA loop represents four linked components of a decision-making process (Horney 2011): observing the environment; orienting within the environment; deciding on subsequent actions; and implementing those actions. Later, Boyd further developed the OODA loop into a number of multiple loops which include feedback as well as "*a number of factors that affect the orientation achieved by the decision maker*" (Brehmer 2005). These factors are composed of: "[*g]enetic heritage, cultural traditions and previous experience, as well as the mental processes of analysis and synthesis*" (Brehmer 2005). Although originally developed to describe military decision-making processes, today the OODA loop is applied across a number of sectors with various commercial companies incorporating it into their business processes, e.g.: "*Intel, Nokia and other corporations to produce a competitive advantage in the marketplace*"(Horney 2011).

Before proceeding further and developing a detailed research methodology we decided to apply the OODA loop to operational conditions, ideas and metaphors. The main finding related to shifts in the conditions of a business environment and modern warfare. We found that there had been significant

change both in the business environment and military action. The modern world has significantly changed since the introduction of various new means of communication. As a result, information, services and products are accessible to a wider audience, while all organisations in the world are connected in a complex network of service providers and goods producers with almost unlimited capabilities for exchanging and adapting to new emergent conditions. While many classical theories of organisational change deal with the ideas of static, incremental change, where all components can be clearly described and interconnections between them easily understood, modern business and military conditions are often diverse, have incomplete information and have non-linear relationships between their components (i.e. constitute CAS). Thus, the modern operating environment requires more proactive behaviour than previously where internal, optimisation of functions (assuming a stable external environment) proved sufficient for success. Consequently, it can be insufficient to simply observe the external environment to develop a necessary understanding of operational conditions, as described in the OODA loop.

These issues led to the Australian Army developing an Adaptation Cycle concept called the ASDA Cycle (Act-Sense-Decide-Adapt). The philosophical underpinnings of the ASDA cycle are based on CAS theory which states that it is not possible "*to learn about or understand a CAS except by interaction with it*" (Kelly & Brennan 2009). Thus, the first step in the ASDA loop is *action*; i.e. to emphasise "*the need to begin interacting – that is to highlight the need for a bias for action, despite having only a rudimentary understanding of the enemy system*

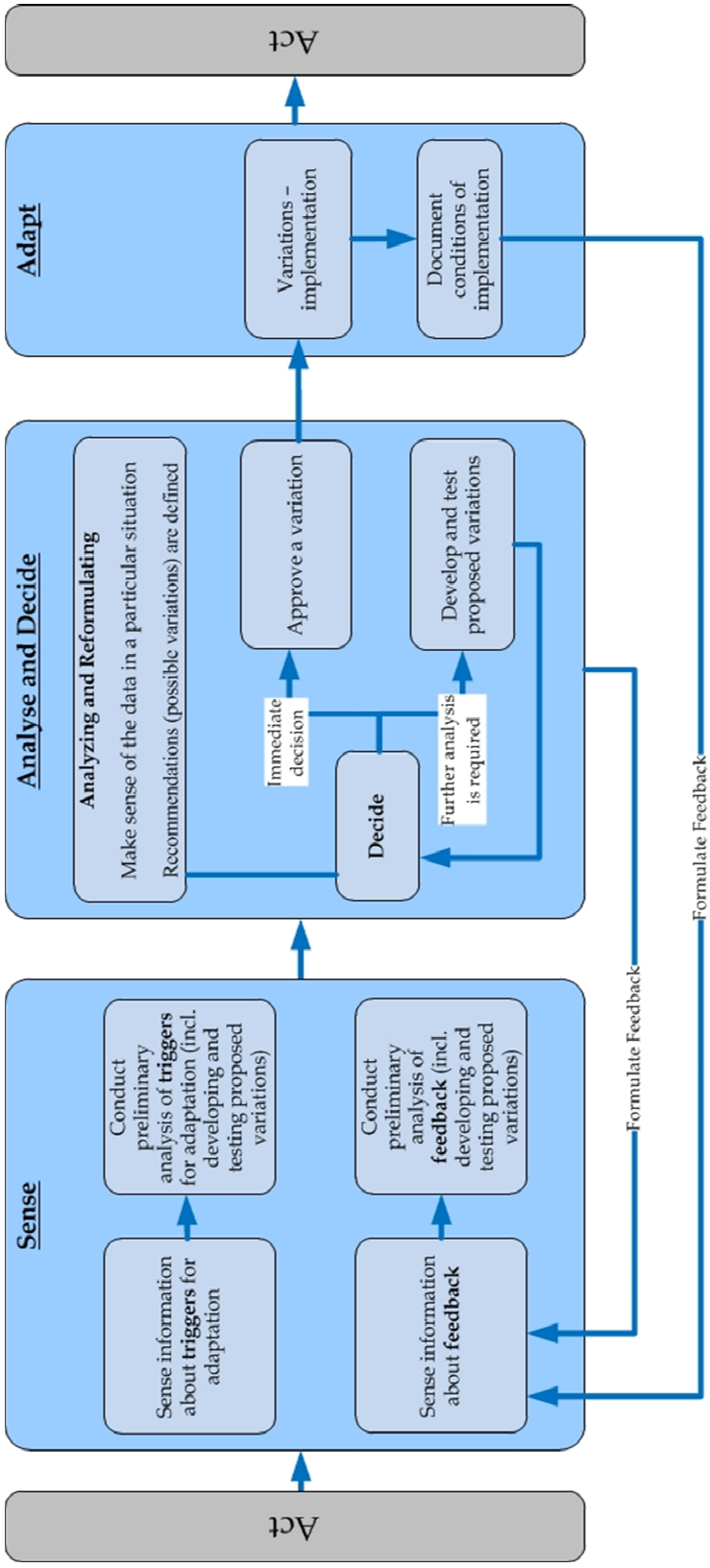

Figure 13. Learning cycle (Act-Sense-Decide-Adapt)

being faced" (Kelly & Brennan 2009). Grisogono shows that adaptive loops have the same components as the OODA loop (Grisogono 2005), while her *"generic model"* gives more details of the adaptation process. Notwithstanding the differences between the OODA and ASDA loops, it is recognised that the two concepts have significant similarities and both can be used to assist in understanding and appraising the continuous learning and adaption of organisations operating in rapidly changing environments. However, the ASDA loop is assumed to be more suitable as it opens up an opportunity for an adaptive approach to learning and adaptation.

We have developed a theoretical model of organisational adaptability by combining aspects of the ASDA learning cycle, a Conceptual Framework for Adaptation (CFA) (Grisogono 2010) and Huber's model of organisational learning (Huber 1991, 2004) – Figure 13. This section defines the main aspects for each of the four steps of the adaptation cycle and leading to a summary of desirable characteristics for an adaptable system.

2.5.2.1. Step 1: Sense

A Sense step has two main goals. The first is to identify the need to initiate the first adaptive cycle. This means that the first adaptive cycle will be launched when one of the triggers of adaptation appears. The second goal of the *Sense* step focuses on tracking feedback on actions being implemented during the preceding adaptive cycle.

Triggers for adaptation initiating adaptation

Understanding how an adaptation cycle is initiated is important as it defines the directions for organisational change. The identification of triggers is a continuous process aimed at ensuring that an organisation remains cognisant of environmental changes. There are three possible *triggers*:

(i) *Operational issues*: the process of recognising defects during day-to-day operations of the organisation.
(ii) *Emergent internal trends*: the process of upper management engaging lower organisational levels to collect information on emergent trends (positive and negative) for further analysis of new options for improvement.
(iii) *Environmental changes*: analysis of the environment to determine the organisation's position within it, as well as defining any external threats and opportunities. Identification of new state of the environment provides an opportunity for proactive action aimed at avoiding negative situations or exploiting positive aspects of the environment.

Sensing feedback

During the *Sense* step feedback on implemented variations are observed. The main goal is to identify if the implementation of an adaptive action has led to desired outcomes by capturing quantitative and qualitative data of success and/or failure. The CFA underlines the importance of feedback, arguing that *"the ability to produce success-relevant feedback about variation … usually from real-world, or internally modelled, interaction between the varied system and the environment"* is one of the main components of a generic model of adaptation (Grisogono 2010). Feedback supports continuous improvement to an adaptive action which is particularly important for an organisation operating in a complex environment, where *"for problems complex enough, it is simply not possible to work out a final solution in advance … [but] interaction with feedback permits starting with a partial solution and improving it through learning over time"* (Grisogono 2010). There are a number of concepts of organisational learning which support the importance of feedback. These concepts are linked to the idea of experiential learning which *"is enhanced by the availability and analysis of feedback"* (Huber 1991).

A general process of sensing is presented below (Figure 14).

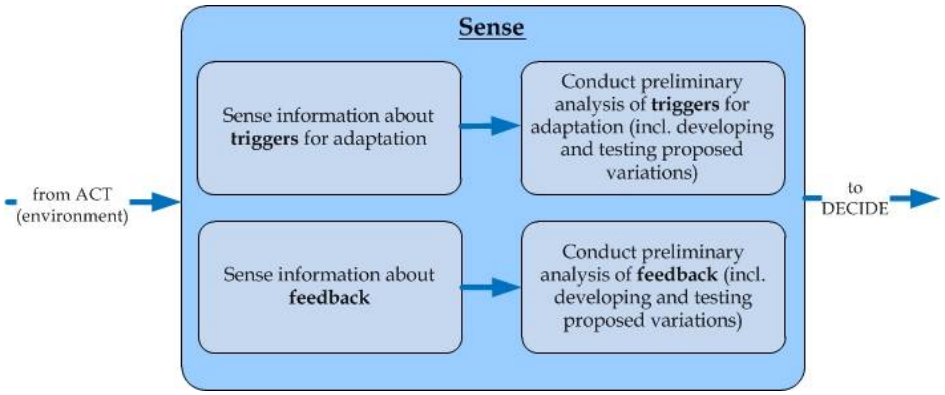

Figure 14. Main aspects of Step 1 – Sense

2.5.2.2. Step 2 and Step 3: Analyse and Decide

The *Decide* step of the adaptation cycle builds on the initial analysis and data collection from the *Sense* step. Analysis and generation of possible adaptive actions should incorporate the processing of different information, including those available from the past and other systems. The first part of the *Decide* step *(Analyse)* involves developing an understanding of the situation and processes relevant to adaptation. Data collected on the performance of processes under review plays a significant role here.

The next part of this step (*Decide*) involves either an immediate decision on variations to be put into implementation or further analysis to generate and test options to address the issues highlighted in Steps 1 and 2. Thus, the *Decide* step can have two possible outcomes: approval of one of the initially defined adaptive actions, or a request for further in depth analysis of the situation, creating a list of more sophisticated actions. The second option is a cycle within the *Decide* step aimed at finding a proper solution(s). The generation of options should be supported by well-developed creativity techniques (e.g. brainstorming, scenario analysis etc.) and then tested either through simulation or trials in order to support decision-makers to select their preferred alternative. From an adaptation perspective, an important part of the decision-making process is the proper documentation and

communication of decisions. This supports timely and proper data collection and the evaluation of feedback. A general process of *Analyse* and *Decide* is presented below (Figure 15).

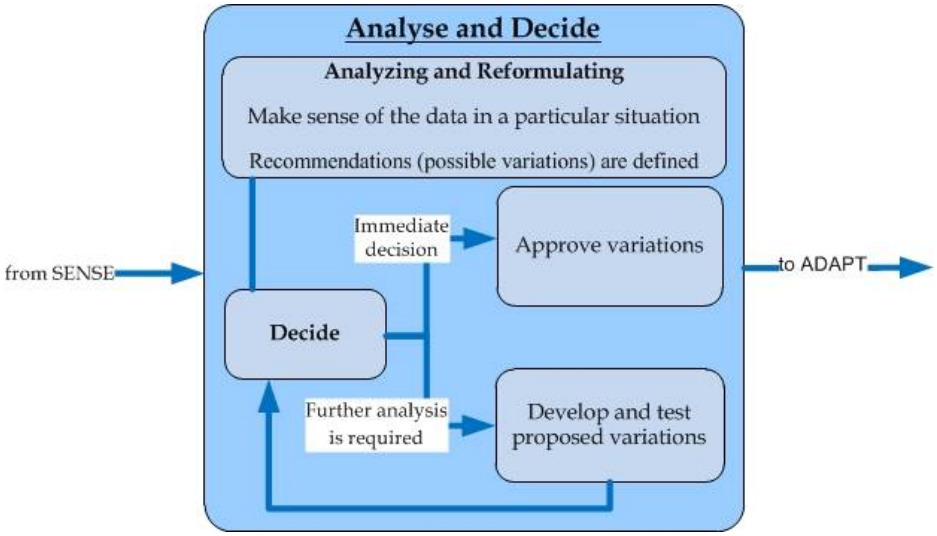

Figure 15. Main aspects of Step 2&3 – Analyse and Decide

2.5.2.3. Step 4: Adapt

The *Adapt* step contains a number of processes to prepare the approved adaptive action for implementation, providing instructions for practical testing, clarification of requirements for data collection and definition of roles/responsibilities for every step of the implementation (Figure 16).

The implementation of an adaptive action incorporates the following steps:

- Developing the implementation plans, including the expected environmental conditions and its expected impact.
- Preparation of a 'means of monitoring' the implementation of an adaptive action – short-term feedback. Identification of those parameters that will support the evaluation of an adaptive action.
- Preparation to support the monitoring of an adaptive action, including development of a technical base and internal tests of the adaptive action in simulated conditions as close as possible to the expected real-world environment.
- Refinement of an adaptive action based on the result of the internal planning (if required).
- Implementation of an adaptive action to the expected system.

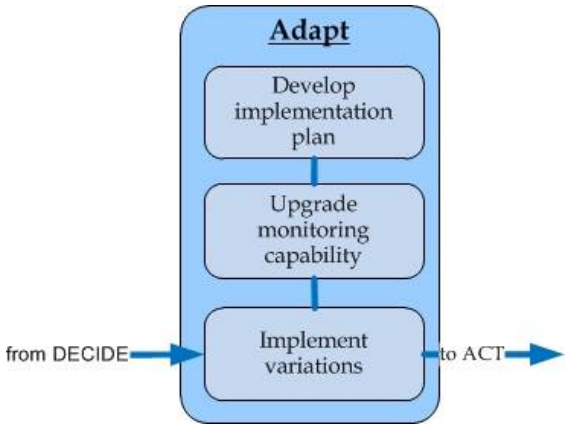

Figure 16. Main aspects of Step 4 – Adapt

2.5.3. Link to the Huber's model of organisational learning

A generic model of adaptation (or adaptive cycle) has a strong link to Huber's model of organisational learning. Table 1 below demonstrates how ideas discussed in the CFA through the knowledge of biological evolution mirrors the ideas of organisational learning. This underlines the importance of learning at all organisational levels for organisational change and adaptation to be successful.

Table 1. Organisational adaptation and organisational learning concepts

Adaptation cycle	Organisational learning	Description
(1) triggers: operational issues	Performance monitoring	"sensing of the organization's effectiveness in fulfilling its own pre-established goals or the requirements of stakeholders" (Huber 1991)or proxies for success and failure (Grisogono 2010).
	Focused search	"occurs when organizational members or units actively search in a narrow segment of the organization's internal or external environment, often in response to actual or

		suspected problems or opportunities"(Huber 1991).
(2) triggers: emergent internal trends	Organisational self-appraisal	Self-appraisal is "… [a] form of experimental learning ... [which] includes gathering information about problems, concerns, and needed changes from organizational members, organizing this information, sharing it with the members, and involving the members in choosing, planning and implementing actions to correct problems identified"(Huber 1991).
	"Everyone a Sensor" culture	Intelligence gathering treated as an eclectic responsibility: "all employees view themselves as environmental sensors for the organization and see themselves as responsible for fulfilling this role"(Huber 2004, p. 55). Facilitated by (Huber 2004, pp. 57-58): (1) "intensified and formulized efforts to ensure that all of the firm's sensors are attuned to the nature of information important to the organization" (2) provide "guidelines and devices that facilitate the sensor's making appropriate message-routing decisions"
(3) triggers: environmental changes	Scanning	"Scanning varies from high vigilance, active scanning, to the routine scanning or mere maintenance of a state of alertness for nonroutine (but relevant) information, as in the "passive search" (Huber 1991).
	Specialised	Specialized accountability: "greater level of expertise will be necessary for effective

	accountability	environmental sensing. Firms will be forced to use specialists to scan, probe, and interpret … components of the environment" (Huber 2004, p. 53).
	Learning from others – vicarious learning	Absorb knowledge from the organization's environment.
Sensing feedback	Learning from action probes and operations	"Experiential learning includes learning from feedback about the effectiveness of changed operations whether or not they were intended as learning probes" (Huber 2004, p. 127). Even though some actions can be viewed as unintended, the successful operation of adaptive cycle requires perceiving almost every change as an adaptive action. This in turn necessitates the sensing of feedback from the environment for the implemented action. "By compressing the learning cycle into a brief period and then coupling it with revised, updated information, organizations can more quickly assimilate new observations; can more easily compare predicted and actual behaviors; and can more readily identify problems and disabilities. Companies can obtain these benefits even with simple feedback processes" (Garvin 2000).
Analysing and Reformulating: make sense of the data in a particular situation	A "vigilant process" is a "process that ensures consideration of	"encoding of information into the system" (Grisogono 2010). The process involves a 'transcription' of the collected information (general or feedback) into systems parameters. "the existence of an internal yardstick for

	multiple options and broad-scope review of key considerations".	judging variations for their impact on success or fitness" (Grisogono 2010): Information relevant to a system should be analysed in order to identify what it means to it.
Generate and test variation (a number of adaptive actions)	A combination of two decision processes – "the parallel development of multiple alternatives and the extensive use of real-time information" (Huber 2004, pp. 89-91).	The "ability to produce variations in aspects of the system" (Grisogono 2010). If an adaptive action is required a number of variation options should be generated and tested for possible implementation.
Select an adaptive action for implementation	Decision-making processes	"this includes not just using the feedback to assess variations for their potential to aid success, but also the resulting decision and its implementation, i.e. reinforcement and propagation of selected variations and elimination and suppression of discarded variation" (Grisogono 2010). Decision-making rules should be applied; e.g. to identify when an adaptive action is sustainable (i.e. no further refinement is necessary and active monitoring can be stopped).

2.5.4. Characteristics of adaptation/learning cycle

Having described the learning cycle, a preliminary list of general characteristics that are necessary for organisational adaptability can be identified. These characteristics should be used to build a system view of learning processes in an organisation. At this stage the characteristics are used to identify the existence of the required processes only, but not to evaluate their quality (Figure 17).

Sense:

- Sense information:
  - data collection team,
  - process/methods to support data collection,
  - periodic sensing/monitoring process,
  - data repository,
  - process to observe triggers, and
  - process to obtain feedback on prior adaptive changes.
- Conduct preliminary analysis:
  - data analysis team,
  - data repository for analysed data,
  - process/methods to analyse data from the past and learn from other systems,
  - periodic process/methods to analyse data from triggers to derive themes,
  - periodic process/methods to analyse data from feedback, and
  - process to report analysed information (including identification of possible variations and their test) to appropriate decision authorities.

Analyse and Decide:

- Analyse and Decide:
  - decision-making authority,
  - authority to direct tasking,
  - the ability to influence – indirect tasking,
  - document task,

- structured process of decision-making for variations approval (incl. documentation of reasons and guidance for further analysis), and
- data repository for decisions.

- Formulate Feedback:
  - process to inform data collection teams about decisions and areas impacted, and
  - define impact decisions expected from decisions.

Adapt:

- Implementation:
  - process to capture parameters of implementation,
  - process to capture conditions of implementation,
  - data repository for implementation information, and
  - process to support implementation information sharing.

- Formulate Feedback:
  - process to inform data collection teams about expected impact of the implementation.

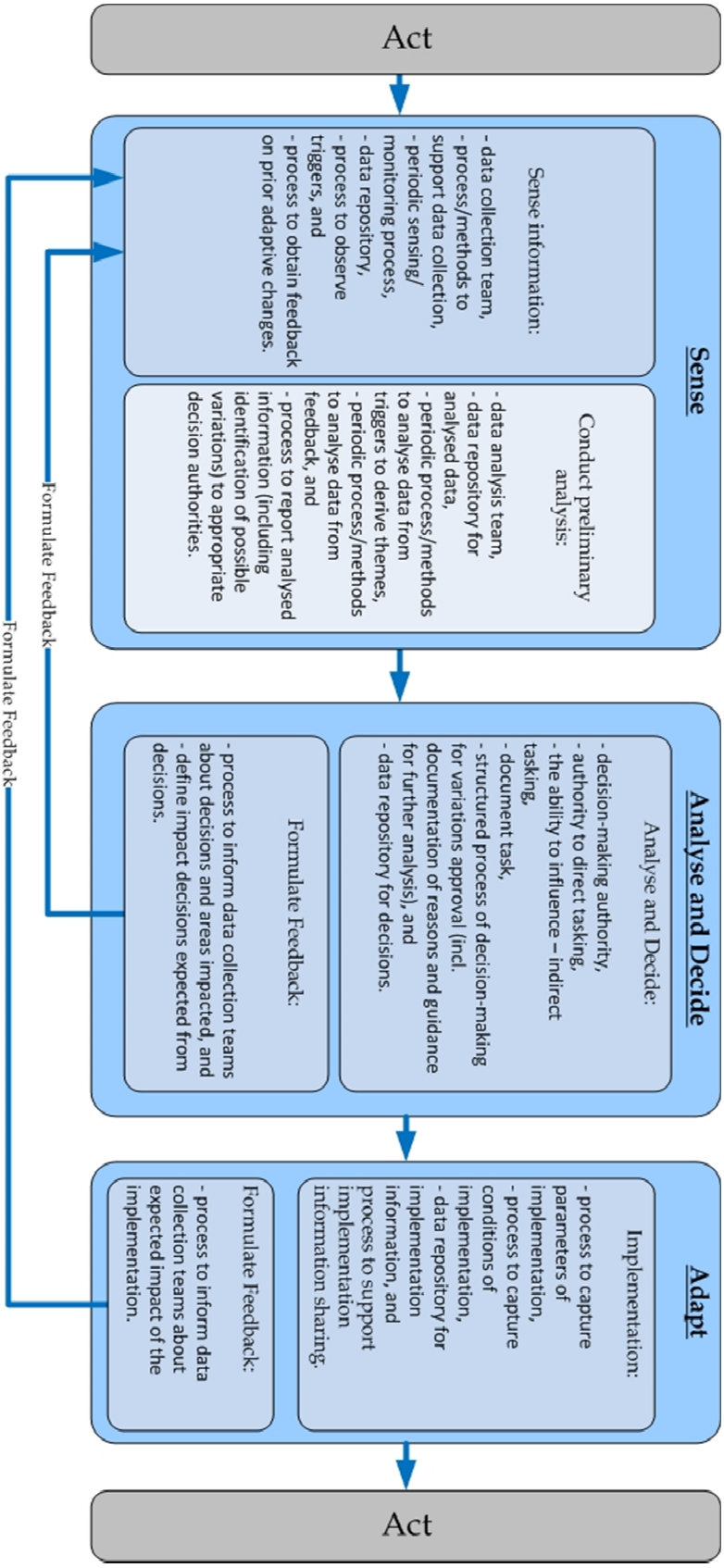

Figure 17. Characteristics of adaptation/learning cycle

2.5.5. Scales of adaptation

Organisational adaptation is a combination of different adaptive processes aimed at achieving a common level of organisational success. Thus, adaptive processes should be in place for different functions at various organisational scales and linked into a network representing organisational adaptation. The organisational learning literature highlights three main levels of organisational learning processes: individual, group and organisational.

To review organisational-level adaptability, we suggest to apply a CFA perspective to the various organisational scales – from top through medium to bottom. This will allow us to combine both a top-down and bottom-up approach to appraising organisational adaptability. The application of CFA perspective to the top organisational scale will give a general model of an organisation and its ability to manoeuvre within some pre-determined frames to choose a strategic course of action. The application of CFA lens to the medium scale will provide a more detailed understanding of the design of (particular) organisational processes and their location in correlation with the general model of organisation (at top organisational scale). Finally, the application of CFA to the bottom scale will allow us to involve individuals in the review of organisational adaptability and get their perspectives on conditions they work in and the rules they operate within.

Linking all three main scales together will give a general picture of organisational-level adaptability as well as demonstrate how various adaptive cycles work together to achieve the required level of organisational success. A network of adaptive cycles of various dimensions represents an '*adaptation architecture*' that actually reflects ideas of systems thinking and reinforces the interconnectedness of its organisational parts (Grisogono 2011). It acknowledges the impact every single adaptive cycle can have on an

entire organisation and therefore highlights the importance of viewing an organisation as a whole.

2.5.6. Classes of adaptation

A clear distinction should be drawn between the two types of processes that are relevant to organisational adaptability.

The ***first*** type of process relates to the main function that the organisation or its part performs. This means that we need to review an organisation from a functional perspective, i.e., an organisation or its department has as the main purpose for its existence to conduct actions that will deliver core goods or services. This *organisational process* we also call an *objective function*. In general, the level of success of an organisation correlates with the successful implementation of the *objective function*, i.e., the *concept of fitness* that includes the notion of success and failure. For example, a procurement department exists to supply all other departments with goods. It is possible to say that the supply of goods is the *objective function* of the procurement department. If the department manages to provide the necessary quantity and quality of goods to other departments in time – we can say that it successfully performs its objective function. The procurement department tries to continuously improve its objective function and adapt itself to the changing conditions. Thus, the goal of *the adaptation process of the objective function* is to maintain an accepted level of success of the procurement department and continuously improve its objective function.

However, the performance and outcomes of the objective function depend on other properties of an organisation and its ability to sufficiently withstand external forces and influences. In other words, the objective function needs a *supporting infrastructure* (i.e. it should incorporate other properties) to be able to produce the core outcome irrespective of external changes. A supporting

infrastructure has a number of properties that allow an organisation to maintain the right conditions of work for the objective function; properties that make an organisation flexible, resilient, agile and responsive. These properties relate to the ***second*** type of processes that help an organisation to maintain its ability to deliver its required output under various circumstances. The adaption can work on those properties as well; the driving force for *the adaptation process of the properties of supporting infrastructure* is the same *concept of fitness*, which is used for the *adaptation process of the objective function*.

Thus, there are two main types of processes (in the organisation): the *objective function* to produce the main outcome, and the *processes of supporting infrastructure* that allows the objective function to operate under various conditions. A generic model of adaption (or adaptive cycle) can be applied to both types of processes with the same aim to reach the desired level of organisational success (Figure 18). As a result, there are five possible adaptive cycles (one for the objective function and four for every property of the supporting infrastructure – responsiveness, agility, flexibility and resilience – which are also called as classes of adaptation) exist in an organisation and work around one objective function; all of them have the same concept of fitness.

Processes of supporting infrastructure refer to classes of adaptation described in the CFA. In simple words classes of adaptation concern possible organisational responses to the external changes. They take a 'black box' perspective and identify how an organisation responds to different types of unexpected changes. These classes are (Grisogono 2010):

- **Flexibility** – the ability to maintain effectiveness across a range of tasks, situations and conditions within a single line of operation. For

example, the structure and capability of the force be reconfigured in different ways, to do different tasks, under different sets of conditions.

- **Agility** – the ability to dynamically manage the balance and weight of effort across all lines of operation in time and space.
- **Resilience** – the capacity to sustain loss, damage and setbacks and still maintain essential levels of capability across core functions.
- **Responsiveness** – the ability to rapidly identify, and then appropriately respond to, new threats and opportunities within a line of operation.

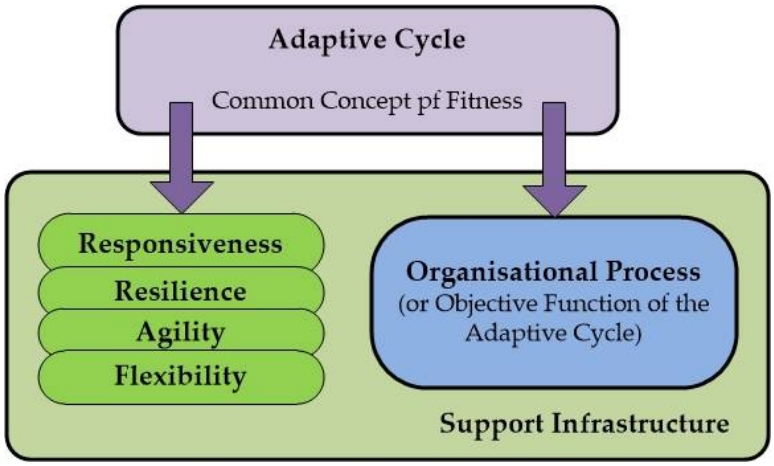

Figure 18. Objective function and classes of adaptation as a supporting infrastructure.

Every class can be viewed as a separate target for adaptation with its own adaptive process that aims at increasing the level of success of the objective function. Therefore, every class of adaptation has its own parameters inherent to the adaptive cycle. To provide more comprehensive description of the classes of adaptation we used the following parameters of the adaptive cycle: measures of success and failure (proxies); target of adaptation; drivers of adaptation; triggers of adaptation; and ways of detection and measures (Table 2).

Table 2. Description of classes of adaptation.

Flexibility	Agility	Resilience	Responsiveness	
Deliver useful (demanded) output – concept of fitness	Increase fitness through system change	Acceptable (Critical) level of output	Acceptable (Critical) response time	**Proxies**
Ability to deliver alternative output	Ability to alternate system capabilities to deliver required output	Ability to deliver essential output with partial failure or loss of system elements or their capabilities	Ability to adjust system performance within required timeframe	**Target of adaptation**
Change of requirements for output Demand in different output	New conditions of environment are different to system design assumptions New information/system changes can benefit to fitness	Changes in environment or external impacts which can damage the system or decrease its performance, e.g. cut in budget or resources	Changes in environment which can affect response time	**Drivers for adaptation**
• Negative feedback (decrease in demand of existing output) • Existing challenge; • Potential to increase fitness	• Negative feedback; • Existing challenge; • Forecast (potential to increase fitness and probability of receiving negative feedback)	• Negative feedback • Existing challenge; • Forecast (probability of receiving negative feedback)	• Negative feedback • Existing challenge; • Forecast	**Triggers for adaptation**
Detection: development of spare capabilities (not related to the delivery of the existing output), reduction of resistance to change **Measure**: amount of change/cost of change; range of capabilities.	**Detection**: changes in internal structure or methods of delivery of output. **Measure**: increase of fitness (including avoidance of negative feedback)/cost of changes.	**Detection**: forecasting and simulation of negative impacts from environment; attempts to increase reliability and minimise risks. **Measure**: contribution to system fitness in relation to risk of loss of capabilities.	**Detection**: positive feedback in relation to delivery of system changes in time. **Measure**: contribution to system fitness in relation to response time.	**Detection & Measures**

We are not referring to external literature to discuss each of the classes of adaptation separately. A brief literature review shows that these concepts are interlinked (and sometimes interchangeable) something that complicates its distinctive definition. Thus, we see definitions provided by the CFA as comprehensive enough since they incorporate the basic ideas of flexibility, agility, responsiveness and resilience. Moreover, the CFA itself represents a piece of work that has already summarised these concepts.

2.5.7. Levels of adaptation

Adaptation deals with an objective function that produces outcomes. In other words, adaptation focuses on a particular process that aims to maintain an appropriate level of success. When the objective function delivers the required outcome, no adaptive actions are needed, only sensing should work to continuously monitor incoming changes. If anything triggers this off, the adaption alerts itself to the incoming or existing changes or issues, the starting the full cycle of adjustment till the required level of success is achieved.

How does adaptation work? What does it change? To answer these questions it is necessary to view the next part of the CFA – *levels of adaptation*. Levels of adaptation look inside the adaptive cycle and determine what exactly it changes. Levels of adaptation have similar ideas to single-, double- and triple-loop learning as well as adding extra layers that concern measures of

success and failure and the co-existence within a wider environment and other CASs[26].

As we can see now – there are five main adaptive cycles that can be viewed separately: the adaptive cycle of the objective function and four adaptive cycles focused on four classes of adaptation. If required, every adaptive cycle can work at various levels of sophistication, focusing on various aspects of the objective of adaptation (objective function or an adaptive cycle) – the CFA calls this *levels of adaptation*. In other words levels of adaptation tell us what adaptation aims to change in order to achieve the desired level of success. CFA describes five levels of adaptation (Grisogono 2010):

- **Level 1: action-in-the-world** mechanisms operate with the determined parameters of the object of adaptation (objective function or classes of adaptation) thus making data processing, variation and decision-making "*within the constraints of existing sense, process and act capabilities*". This concept represents an optimisation of existing parameters of an organisation or its particular function.
- **Level 2: learning** uses adaptive mechanisms to create new behaviour models or add new capabilities. It aims to improve the action-in-the-world level of adaptation. This concept is an attempt to introduce new

[26] Levels of adaptation have similar ideas of layered learning as other concepts of organisational learning, such as single-loop and double-loop learning by Argylis and Schon, lower-level and higher-level learning by Fiol and Lyles, first-order and second-order learning by Arthur and Aiman-Smith, exploitation and exploration by Levinthal and March, incremental and radical learning by Miner and Mezias, and adaptive and generative learning by Senge (Tosey 2011). For example, single-loop learning concerns the detection or correction an error "without questioning or altering the underlying values of the system" (Argyris 1995); the same approach is taken by the first level of adaptation, when the system utilises existing tools and methods to correct misalignment between desired and actual outcomes. Double-loop learning concerns "examining and altering the governing variables and then the actions" (Argyris 1995); the same approach can be found in the second and third levels of adaptation, when the system seeks to introduce something new to a normal operation in order to improve outcomes of the first level of adaptation, or even question the way the systems works.

ways of behaviour of an organisation or its particular function without questioning underlying values and assumptions.

- **Level 3: learning-to-learn** focuses on "*aspects of how variations are created, evaluated, selected, and propagated or eliminated*" at the learning level of adaptation. It also estimates the effectiveness of the learning level by means of collecting data about its activities, and generates new methods to create behaviour models. In general this level of adaptation aims to review the existing processes of adaptation in order to determine their effectiveness and adjust them if needed. This concept questions organisational processes by answering the question '*what are we doing wrong in adjusting to changes?*'
- **Level 4: defining success** is the "*internalised success/failure proxy measures [which are] used for the lower three levels*". This level of adaptation questions the proxies used to interpret the success or failure of an organisation. As was mentioned before, the real parameters of success can be difficult to identify as it can take huge effort or time. Therefore, an organisation is used to developing its own system to evaluate its success – performance indicators, targets, satisfactory level, etc. *Do this system of success parameters represent reality in a right (close enough way)?* In other words level 4 tries to find out if the parameters of success used at the levels 1, 2 and 3 are relevant to the current circumstances.
- **Level 5: co-adaptation** is "*addressing the interactions between multiple adaptive mechanisms and applying adaptation to the parameters describing the distribution of roles, resources, authorities and responsibilities between them*". The level 5 of adaptation concerns the way a particular adaptive cycle operates within a wider environment – with other adaptive cycles within an organisation, or even within bigger CAS. This acknowledges the fact that an organisation (or its particular

processes) does not exist in isolation; thus, it should be continuously concerned about how its processes relate to other internal and external systems.

The interconnections between the levels of adaptation are presented in Figure 19.

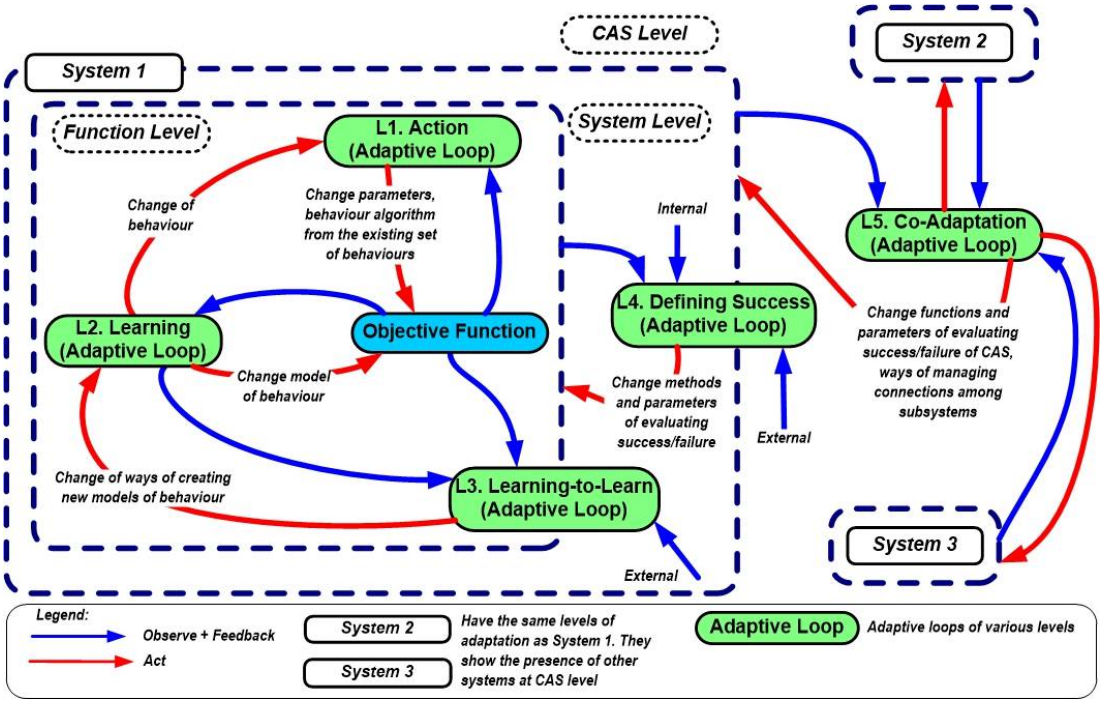

Figure 19: Levels of adaptation

The explanation of levels of adaptation should be provided here. If the organisation or its parts deliver required outcomes then no adaptation is required. If the organisation somehow (through negative feedback, inappropriate outcomes, incoming or existing changes of it environment) identifies the necessity to change, then the first adaptive cycle is initiated. It will start from the lower level of adaptation – level 1 called 'action-in-the-world'. If this level 1 improves outcomes, then the adaptation cycle will stop – only sensing will continue working. If after several attempts level 1 does not improve the situation then level 2 (learning) will be triggered to act. Unsuccessful operation of the level 2 will call for the level 3 and so on. Every

successive level generates new 'tools' for the level below – thus, improving the work of the lower levels: levels of adaptation that are hierarchically nested with every successive level operating "*on all the previous levels … adding more power to them*" (Grisogono 2010). However, a move from one level of adaptation to another should be triggered, i.e. there should be recognition of the need to initiate the next level of adaptation.

However, if the organisation or its parts operates within the accepted frames of success and failure then adaptation cannot be triggered or it can stop at any level of adaptation that has led to desired outcomes. Therefore, the level of adaption at which a particular organisation or its part operates now is not a measure of the general level of adaptability. General measures of adaptability are the results of successful operations over time and the ability of an organisation to successfully change itself under different external forces.

2.5.8. Levels and classes of adaptation

Classes and levels of adaptation do not exist independently. As was shown above, an adaptive cycle can work on classes of adaptation as well as at supporting the success of an objective function. Therefore, it is reasonable to think what levels of adaptation mean in relation to classes of adaptation. For that we developed a 'classes vs levels' matrix to demonstrate how various adaptive cycles operate for every class at various level (Table 3).

Overall picture of the CFA components is shown on the Figure 20.

Table 3. Classes of adaptation versus Levels of adaptation

	Responsiveness	Resilience	Agility	Flexibility	Continuous improvement
Level1: action in the world	- Identifying critical parameters of the response time; - Analysis of previous cases of change to check response time; - Identifying possible ways in the existing system to improve response time.	- Identify parameters of output required from the system; - Identifying critical cases of possible threats for the existing system; - Analysis of the system to investigate possible existing ways of overcoming known threats.	Optimising system parameters to make the system able to produce required output in different conditions of environment.	Extension and optimisation of system parameters to make the system able to deliver alternative output.	Continuous optimisation of system work parameters to increase fitness.
Level 2: Learning	Identifying and introducing ways of speeding up the learning cycle without loss in output quality.	- Identification of possible threats and opportunities in the future; - Development of the new emergency plans to overcome threats and produce required outcome.	- Identification of possible new directions for system to operate - Development of the capabilities in system to work in new directions.	Introducing new tools and methods that will help to increase the variety of the output.	Continuous search and implementation of ways to produce output.
Level 3: Learning to learn	Review and optimisation of business processes to reduce the response time without loss in the output quality.	- Improving ways of identifying possible threats; - Improving ways of developing, introducing and implementing emergency plans.	- Improving ways of identifying new possible directions of work; - Improving ways of developing, introducing and implementing new capabilities in system to work in new directions.	Introducing new work methodology or approaches to increase the property of universality of the system.	Continuous improvement of the internal system processes relevant to monitoring, producing and evaluating output.
Level 4: Define success	Clarify and verify critical parameters of the response time in relation to the system's fitness.	Clarify parameters of possible threats and opportunities and their possible impact on the quality of the required system's output.	Clarify ways the system determines new possible directions of work.	Clarify ways the system uses its capability and their combination to produce a variety of outputs.	Clarify ways the system identifies the effectiveness and efficiency of its work processes.
Level 5: Co-adaptation	Develop methods of a timely collection and analysis of other adaptive systems' dynamics.	Identify a minimal set of capabilities that are required to maintain the balance of interactions with other adaptive systems.	Measure the level of influence (and its changes in time) of other adaptive systems.	Analyse the spectrum of possible interactions with other adaptive systems.	Clarify ways the system identifies its position in the relation to other adaptive systems.

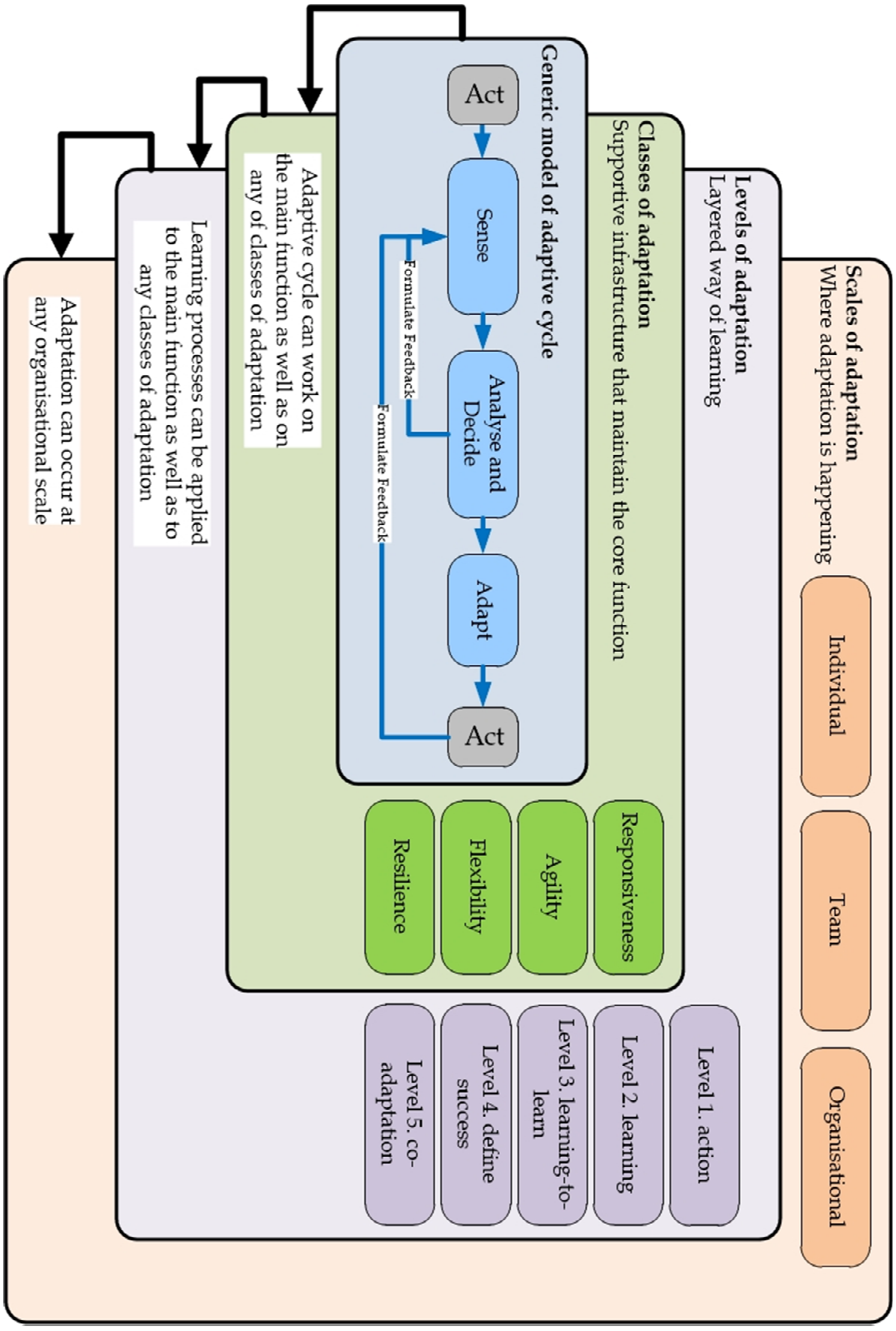

Figure 20. CFA components

2.6. Literature review summary

The chapter has covered the terrain of knowledge relevant to the development of the leading ideas in this thesis. A number of important insights have emerged that, taken together, help to position the thesis within a contextual background and relevant literature concepts:

- ✓ The modern global security environment with modern means of communication leads to an enlarged pattern of what we term globalisation, and places military organisations in a context of a system with interlinked agents.
- ✓ Modern military engagements have changed significantly, bringing in a diversity of operations including peacekeeping, natural disaster relief, insurgency, terrorism, and humanitarian operations.
- ✓ Other factors of the global security environment (e.g., migration, global warning) increase tension in some world regions making them 'hot spots' that are need to be monitored by the global community.
- ✓ The above conditions represent the external complexity that modern militaries operate within and which in turn forces them to adapt accordingly in order to maintain their *'fit for purpose'* and remain effective.
- ✓ Military literature provides examples of organisational change (the US and UK armies) that were implemented in response to changed operational conditions.
- ✓ Internal complexity of militaries is presented by a hierarchical, bureaucratic and command-and-control structure complicated by the social domain expressed through concepts of leadership and organisational culture.

- ✓ Classic ways of seeing systems and their changes are based on linear methods of planning that include hierarchical structure and decomposition as a means of control.
- ✓ Complexity theory and its branch complex adaptive system (CAS) theory represent an alternative way of perceiving organisational change and seek to avoid the disadvantages of classical theories of organisational change.
- ✓ CAS is seen as a suitable approach to describe the external and internal complexities of modern militaries.
- ✓ CAS theory pays particular attention to adaptability as a property of a system to preserve its '*fit for purpose*'.
- ✓ A number of frameworks and methods exist that aim to design, predict and manage organisational adaptability.
- ✓ Conceptual Framework for Adaptation (CFA) is seen as one that provides a good descriptive foundation to appraise the adaptability of militaries.
- ✓ Organisational learning complements ideas of CFA and is seen as a mechanism for change. Particular attention is given to Huber's model of information processing.
- ✓ Both CFA and organisational learning maintain a systems thinking perspective on the overall process of organisational adaptation.
- ✓ Finally, an attempt to convert abstract aspects of CFA into practical set of ideas is presented.

In the following chapter attention turns to the research methodology employed to appraise the case of organisational adaptation and the processes of learning.

Chapter 3
Research methodology

This chapter covers aspects of the research methodology (Figure 21):

Section 3.1 demonstrates how the study was conducted. To do that we describe two parts of the research: the review of the case of organisational change (Adaptive Army Initiative or AAI) and the review of particular mechanisms of organisational learning (Army Lessons Network or ALN). Importantly, ALN is one of the AAI goals that make it possible to identify a link between strategic planning of the AAI and its particular practical outcome – ALN. Both reviews aim at appraising organisational adaptation of the Australian Army by focusing on the Conceptual Framework for Adaptation (CFA). Through the description of ways and means of conducting the research we cover the following areas: ethical considerations, methods of data collection, participants sampling and description, interviews and workshops settings, and research limitations.

Section 3.2 discusses the research from more philosophical perspective. We view the research as an *exploratory study* inherently based on *constructivism* and *qualitative* methods of data collection and analysis. We strongly believe that an analysis of complex system and their behaviour can be done though the engagement with its participants who design, manage and use an organisation and therefore can share their experience and knowledge. Through this approach we can learn how a

complex (structurally, functionally and culturally) organisation such as an army recognises new challenges and changes itself.

Section 3.3 lists limitations of the current research.

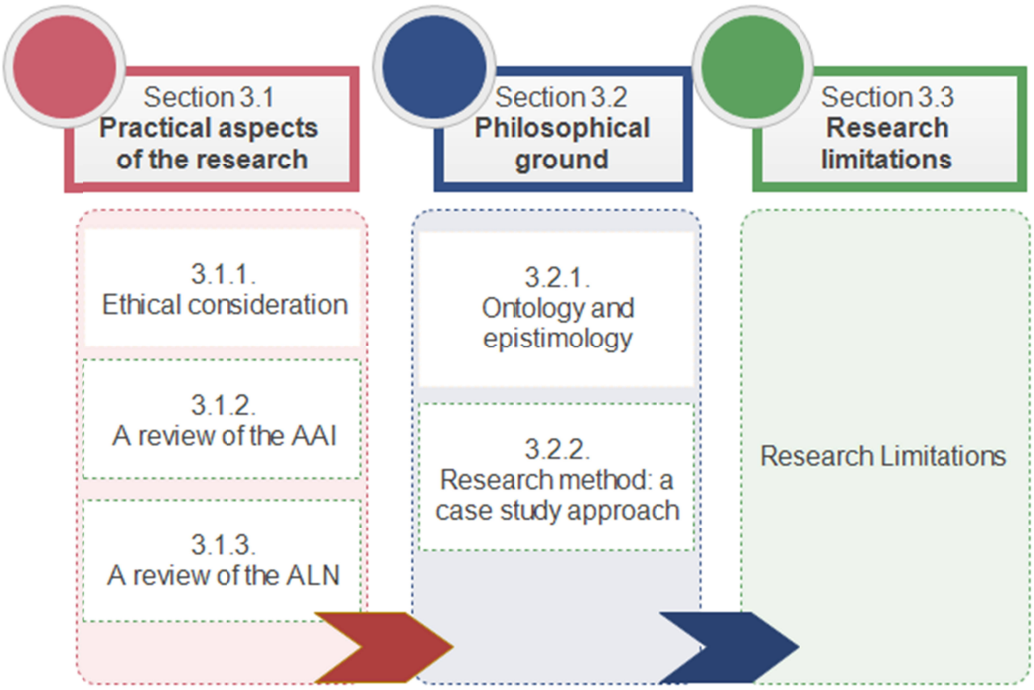

Figure 21. Structure of the Research Methodology chapter

3.1. Practical aspects of the research

The case study of organisational change, known as AAI, in the Australian Army was conducted in three steps:

1. Semi-structured interviews with high ranking Army Officers to get their perception on the current organisational change as well as expectations they had, results achieved so far and their ideas of directions for further improvement.
2. A review of particular learning processes that had been developed as a result of the organisational change – the Army Lessons Network (ALN). Our approach is to develop a system of systems view of the

ALN. This uses a case study approach that is conducted in the following way: (i) a designed view that is built on formal documents; (ii) as-is view that is built on information available from interviews, workshops and information requests; (iii) a comparison of two views, leading to an analysis of the adaptive properties of the learning processes and to the review of the research model for its further improvement.

3. The final step focuses on identifying a correlation between the ALN case study and the organisational change itself through the comparison processes of organisational change and learning with the main principles of CAS. For both parts of the appraisal we utilise the Conceptual Framework for Adaptation (CFA), which provides a summary of adaptive characteristics of biological systems and is used as a means to appraise this particular case of organisational adaptation (Australian Army). Moreover, the application of the CFA in different ways in the organisation – particular processes of learning and strategic organisational planning and change – creates a foundation for testing the CFA model and its applicability at different organisational scales.

3.1.1. Ethical consideration

The research was done in collaboration with the DST Group (former DSTO) and its representative Dr Matthew Richmond who facilitated engagement with military personnel, provided access to relevant documentation and data, and facilitated ethical aspects of the study. Therefore, the paperwork included double ethical approval – one obtained for the DST Group and another for the University of Adelaide; the research was also supported by the Australian Army through the approval signed by its representative BRIG

Ryan (Appendix A. Ethics approvals). There are several important points of the ethical consideration:

(i) ***Personal impact.*** It was acknowledged that the research, being conducted in a real-life organisation, may potentially impact on participants (especially those at a lower organisational levels) as critical opinions can be expressed. To avoid this situation, we considered two options. First, we gained an agreement from the participants to be interviewed; that included an option for their names to be hidden or mentioned in the final report. Second, we sought an agreement for the interviews to be audio recorded. Several participants decided not to reveal their names in papers resulting from the interviews – thus, their identifiers were excluded from the data analysis and discussion chapters. One participant did not give an approval to the university researchers to use information from the interview.

(ii) ***Organisational impact.*** Work with an organisation such as an army is always sensitive by its nature. Questions raised by research can directly or indirectly concern national security as well as other politically sensitive areas. Therefore, the DST Group ethical approval had to cover these aspects of the research that allows us, external researchers, to obtain access to the military personnel.

(iii) The ALN review was included in the ethics application submitted to The University of Adelaide, while the DST Group did not need it. Therefore, the review of the ALN was conducted in collaboration with the DST Group for which it was an ongoing project; permission was provided to the researchers to use

information from the ALN review, while no special ethical approval was required.

Both ethical applications, DST Group and the University, contained the same Information Sheets that included the description of the research project as well as Content Forms the signed version of which gave us permission to interview participants. These documents were sent to prospective interviewees via e-mail before the interviews opening up an opportunity for them to raise concerns before the interviews and provide us with the agreement to participate.

We should also note that the process of obtaining ethical approval from the University revealed unexpected difficulties and delays. DST Group managed to sort their paperwork out within a half an hour, while it took the University three months to get the research approved. This situation created a very high probability of failure for the whole research project as it was difficult that action-orientated people such as Army Officers will wait for an extended period and maintain a level of interest until all papers had been sorted.

3.1.2. A review of the AAI

In 2014, more than five years on from the implementation of the AAI, we were interested to see how well the AAI had met its original goals and more generally how adaptive the Army had become in the meantime. We were also interested in gaining insights into the events that led to the initiation of the AAI, its conceptualisation and any issues during its rollout. The review of the AAI was imitated to explore how the Australian Army as a complex organisation, given its multiple functions and levels of command and control, actively manages its adaptation to a continuously changing environment from a theoretical perspective. The focus was on the operational aspects (process, structures and roles) that make an organisation adaptable to

changing conditions. The review of the AAI is based on the information gained from the interviews of the Army Officers.

3.1.2.1. Data collection

There are two main sources of data for the AAI review:

A. ***Primary data.*** Semi-structured interviews of the Army Officers and people external to the Army that are organised around five main areas: interviewee's background, design of the AAI, implementation of the AAI, impact of the AAI and theoretical underpinnings of the AAI. Every section contains two types of question – main and follow-up (Appendix B. AAI Interview questions). In total 19 interviews were conducted.

B. ***Secondary data.*** A historical overview of the AAI initiation and design '*Preparing the Australian Army for Joint Employment: a Short History of the Adaptive Army Initiative 2007-2010* (Breen 2014)[27] was used to obtain the contextual background of the AAI and roles of its leaders and designers. Another set of documents (Chief of Army official e-mails, Adaptive Army concepts description, presentations and official publications ('Information brief to CA (thru HMSP-A) on Review of Adaptive Army 17 July 2012 (R11822908)' 2012; *Our future: Army Modernisation Update* 2014; Gillespie 2008a, 2008b, 2009a, 2009b)) is also used to develop an understanding of the background of the organisational change under review.

3.1.2.2. AAI Interviews participants

The research focuses on developing an understanding on how a complex system such as the Army adapts to changing external conditions. For this purpose we identified a number of organisational representatives who can provide insights into the process of organisational adaptation. This *purposeful*

[27] Note: Dr Breen paper was published after the commencement of this PhD.

sampling helps to identify participants who are relevant to the research questions rather than those of random selection (Bryman 2012). This means that purposive sampling approach aimed to identify people with the greater degree of awareness and extensive experience of the processes being appraised. A list of interviewees was developed with a help of Dr Richmond from DST Group.

Interviewees can be divided into three main groups (Figure 22 and Table 4):

(i) ***Before the AAI*** – the Army leader AAI who supported the preparation of the AAI.

(ii) ***During the AAI*** – the Army leader and his team who designed and implemented the change. The interviews focus on high -ranking ***Army*** Officers who were involved in the design and implementation of the AAI – their insights are a crucial part of the AAI review.

(iii) ***After the AAI*** – the current Army leader and high-ranking Army Officers who can evaluate the change from a users' perspective. It was also decided to interview mid-level Army Officers working in different areas (Centre of Army Lessons, Army Knowledge Group and Division 1) to get their perspective ***on*** the change and its influence on their work and the Army work in general. Moreover, an external view was also gained though the interview with Commander Joint Operations, an independent military observer and a DST Group researcher who helped to conceptualise aspects of the AAI.

Figure 22. AAI sample

A list of interviewees and their role in the AAI as well as their current positions are provided below (Table 4).

Table 4. Interviewees information[28]

	Name	Position during the AAI	Role in the AAI	Current position
ANONYMOUS INTERVIEWEES	Interviewee A	N/I	Design workshops participant	N/I
	Interviewee B	N/I	One of key contributors of scoping and designing workshop 1; introduced theoretical ideas of adaptation and helped to name the change as 'Adaptive Army', He was involved in the development of the discussion paper that helped to balance different views that emerged during the workshops.	N/I
	Interviewee C	Army Officer	none (mid ranking Officer at the time of the AAI implementation providing general perspective on the impact of the AAI)	Army Officer
	Interviewee D	Army Officer	none (mid ranking Officer at the time of the AAI implementation providing general perspective on the impact of the AAI)	ex-Army Officer
	Interviewee E	N/I	N/I	N/I
	Interviewee F	N/I	N/I	N/I
DURING AAI	LTGEN Ken Gillespie (Ret.)	Chief of Army	Change leader	Director at Australian Strategic Policy Institute
DU	MAJGEN Greg	Colonel Plans -	Assisted BRIG Paul Symon (at	Assistant /commander

[28] Where a field is N/I (Not Identified) the applicant has required their identity not to be revealed, so this information is not provided.

	Bilton	Army	that time) to conduct a number of analysis of Army organisational structure and drafted several models; one of key contributors to scoping and designing workshop 1.	of the US Pacific Forces
	COL Mick Tucker	Director Military Strategic Commitments	One of key contributors of scoping and designing workshop 1	Director Land, HQ JOC
	BRIG Mick Moon (Ret.)	Forces Command	Design workshops participant	Contractor to Defence, Manager Operations, Joint & Combined Training Directorate, Australian Defence Simulation & Training Centre (ADSTC), HQJOC
	MAJGEN Shane Caughey	Chief of Staff HQ FORCOMD	Establish HQ FORCOMD by integrating the functions of LHQ and HQ Training Command and tested HQ FORCOMD model	Deputy J3 CENTCOM (US)
	LTGEN David Morrison (Ret.)	DCA	Introduced the AAI, used war games to test models with Paul Symon. After the introduction of the AAI: COMD FORCOMD, integrated and established FORCOMD	Australian of the Year 2016
	BRIG Peter Clay (Ret.)	COMD LCRC	Implementing the key AAI goals in overseeing the preparedness level	General Manager at CSC
	MAJGEN Paul Symon (Ret.)	Director General Development and Plans - Army	Key figure in the AAI design phase; introduced of AAI, a design workshops facilitator who convened a small, secret compartment of staff referred to as '4D' at AHQ and managed the process drafting options which proposing headquarters structure. He war gamed models	Department of Foreign Affairs

			with LTGEN David Morrison.	
	Dr Anne-Marie Grisogono	DST Group, Research Leader	Analytical support, provided a theoretical perspective	Adjunct Professor at Science21, Flinders University
AAI OUTCOMES FROM MIDDLE LEVEL PERSPECTIVE	Mr Ian Cruickshank	Manager of Capability Development HQ 1Div	Directed AWC, formed two adaptive warfare teams to validate MST and MRE by visiting overseas operations	Manager AWB
	LTCOL Anita Rynne & LTCOL Chris Goodall (Ret.)	Army Officers	none (mid ranking Officer at the time of the AAI implementation providing general perspective on the impact of the AAI)	Army Officers
	LTCOL Mick Say	Army Officer	conducted the first review of the AAI achievements in 2011	Army Officer

3.1.2.3. Interviews settings

The primary data was collected via semi-structured interviews with participants. Semi-structured interviews allowed us to keep an open mind to what we were going to gather from participants and allowed themes to emerge during the conversation (Bryman 2012). Moreover, this approach suited strong-minded personalities common within military forces that might resist firmly structured interviews. Interviews were approved by then Director General Strategic Planning – Army, BRIG Mick Ryan (Appendix A. Ethics approvals). All interviewees were provided with the Information Sheets resulting in the agreement of interviewees to participate on a voluntary basis. There were no refusals to participate – on the contrary, all participants acknowledged the importance of the study.

Majority of the interviews were conducted in person in Adelaide, Canberra, Sydney and Brisbane. Two interviews were conducted over the phone owing to limited personal availability of the interviewees. All interviews were audio recorded. Due to technical issues one of the interviews was not recorded; however, attended researchers summarised interview themes and obtained

their approval via e-mail that allowed us to obtain and record the participant's view. Both researchers from DST Group and The University of Adelaide attended interviews – this helped to overcome any cultural resistance from non-military personnel that exists in semi-closed organisations such as an army.

We followed a procedure that was organised using interview questions (Appendix B. AAI Interview questions). Every interview started with a brief overview of the research objectives followed by the main and follow-up interview questions. However, using a semi-structured interview approach helped us to pick up some specific topics that were not initially included in the procedures; thus, opening up to interviewees an opportunity to uncover emerging rather than expected areas. In some instances it was not possible to follow the strict interview protocol as conversations developed organically without a strict structure – even in those cases where the researchers carefully monitored that all interview questions were answered.

3.1.3. Army Lessons Network (ALN)[29]

The second part of the research concerns particular processes of organisational learning, i.e. Army Lessons Network (ALN). Being one of the AAI goals it represents a specific interest as it demonstrates how the AAI goal was implemented as well as shows how the entire organisation learns from its experience. Moreover, a key to achieving the goals, set out for AAI, is the ability to improve the effectiveness of the adaptive processes themselves, by also subjecting them to adaptive review. As a step towards this, a limited scope review was initiated of one aspect of the AAI: effectiveness of the processes, structures and systems that comprise the

[29] Note: a proportion of what follows is contained in earlier writings, which I co-authored with Dr Matthew Richmond of DST Group (2016).

formal *Army Lessons Network*?[30] ('Information brief to CA (thru HMSP-A) on Review of Adaptive Army 17 July 2012 (R11822908)' 2012). The intended outcomes of the review were to identify practical options for improvement of the ALN that would lead to high pay-offs in effectiveness, to reflect on the review methodology itself and identify options for improving the effectiveness of the CFA methodology in subsequent reviews, and thereby to both demonstrate the utility of adaptive review and to lay the foundations for its further application and improvement.

This review has focused on the Army Learning Network (ALN) from a systems perspective. Formally, the ALN is divided into four temporal learning domains, referred to as learning loops: immediate learning loop (ILL), short learning loop (SLL), medium learning loop (MLL) and long learning loop (LLL) (*Army lessons Policy OPS 10-1* 2010). With the exception of the immediate learning loop (which is deemed to be outside the scope of the review), we investigated each of these areas with a focus on how these temporal organisational learning dimensions combine to address the Army's overall learning. We have concentrated on identifying any gaps/overlaps, with the aim of developing proposals for practical improvements. This should not be interpreted as a criticism of the overall integrity or underpinnings of the ALN, as it has become clear throughout the review that the ALN has many significant strengths, but just a motivational artefact to highlight areas for improvement.

3.1.3.1. Data collection process

The approach contains two main steps and is based on a combination of process modelling, action learning and conceptual analysis (Figure 23). In the

[30] Informal networks that support organisational learning were not directly investigated as a part of this review; however, insights collected as a part of the Army Leaning Organisation project provided context to the recommendations made here and associated risks.

first step: the system's business processes and information flows that facilitate organisational change to update/transform/improve operational processes are described formally in process diagrams (the *designed view* and the *as-is view* that are described below). The diagrams are used to support a gap analysis of actual processes with both directed and desired processes (noting that the quality of the processes is not assessed at this point, but only if they exist or not). In the second step, workshops are organised with key stakeholders to: (i) obtain their insights on the identified gaps in the processes, (ii) critically review processes described in the systems diagrams and assess their effectiveness, and (iii) engage managers/users/operators of the system in the analysis process to facilitate their ownership of any recommendations. Analysis of data from the workshops underpins the definition of key issues, which are corroborated using the analysis of historical examples of the organisation's responses to environmental changes and data analysis of process performance, leading to recommendations to improve system's adaptability.

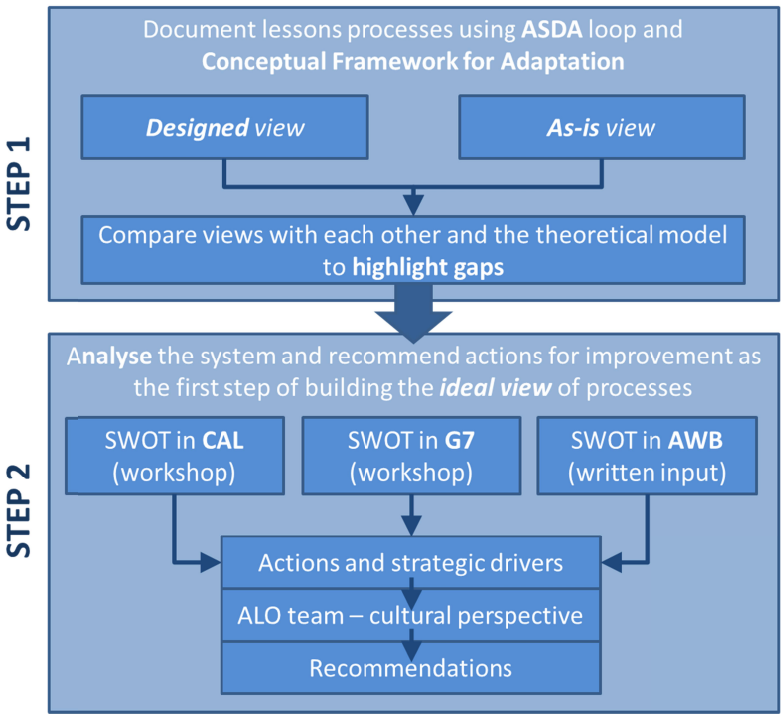

Figure 23. ALN Review Process

3.1.3.2. Review participants

We utilised a purposive sampling approach to discuss *designed* and *as-is* views; the same approach was taken to choose workshops participants and synthesise discussion. This helped us to get perspectives of people who actually operate learning processes across the Army. Stakeholders that were involved in the ALN review included:

- Centre of Army Lessons personnel (CAL) responsible for collecting, analysing, storing and disseminating lessons across all learning loops in the Army.
- G7 branch personnel (HQ FORCOMD) responsible for collective training and lessons of the Medium Learning Loop (MLL).
- AWB personnel (HQ 1DIV) responsible for collective training of units that are ready for deployment and lessons of Short Learning Loop (SLL).

Stakeholders represent units that are actively participate in the processes of the ALN.

3.1.3.3. ALN review methodology

Systems diagrams – designed and as-is views

Initially systems diagrams are developed, using the structure of the learning cycle defined in the previous section. There are two perspectives:

(i) The designed view: i.e. description of the functional workings of the system based on formal documentation; the diagrams describe the business processes, products and information flows between the relevant parts of the network; by explicitly documenting system diagrams we avoid any misinterpretations or misunderstandings when analysing and communicating the system processes. Information that was used to develop

the *designed view* is taken from reference documents. As a result, a general view of processes supporting the *designed view* of learning from operations was developed (Appendix C. Designed and as-is view of the learning processes in the Australian Army). It contains a description of each of the three learning loops – Short, Medium and Long, including connections among loops. Each loop is divided into the four steps of the ASDA loop. The following documents were used to build a *designed view*:

1. DI(A) 10-1, Army Lessons Policy (*Army lessons Policy OPS 10-1* 2010)
2. CA Directive 06/06, CAL, SOPs (*CA Directive 06/06, CAL, SOPs* 2006)
3. Adaptive Warfare Branch Lessons Learned Handbook 2013 (*Adaptive Warfare Branch Lessons Learned Handbook 2013* 2013)
4. FCPD 08-03-01, force Generation Lessons Board (FGLB) ('FCPD 08-03-01, force Generation Lessons Board (FGLB)' 2001)
5. CAL, Active lessons collection handbook, Edition 1, 2001 (*Active Lessons Collection Handbook* 2001)

(ii) *The as-is view*: i.e. how the system functions in reality. Stakeholders and operators are then interviewed to obtain feedback on how the system functions in practice. Information from discussions during visits to the Adaptive Warfare Branch (HQ 1DIV), G7 branch (HQ FORCOMD), 39 PSB (HQ 1DIV) and the CAL (HQ FORCOMD) as well as *"Army's Short Loop Adaptation Process"* (Musil 2011) was used as the basis for its preparation. The *as-is view* demonstrates how processes are actually working in practice and introduces utility as a means to ensure a common understanding of the business processes and functions exists. By comparing the models of the designed view and as-is view, gaps between them are identified. These gaps are a starting point for workshops with stakeholders (CAL, G7 and HQ 1DIV).

Gap analysis and stakeholders engagement

The *designed* and *as-is* views are initially compared to each other and implementation/institutionalisation weaknesses in the existing processes

identified. This analysis is used as the basis for the stakeholders' engagement which focuses on obtaining input from stakeholders on adaptation processes, where issues highlighted during the gap analysis are used to initiate discussion.

We have employed the TOWS method as described by Coyle (Coyle 2004). It provides a well-defined, structured approach to move from: (i) sourcing insights from key stakeholders on relevant processes; to (ii) developing options for overcoming/exploiting external threats and opportunities; to (iii) strategic planning, i.e. options for organisational change that can be traced back to the stakeholders insights. TOWS is an extended version of SWOT (Strengths-Weaknesses-Opportunities-Threats) analysis, where the first part involves the running of workshops with key stakeholders to facilitate their input into "*thinking about the threats and opportunities of the external world before considering the internal weaknesses and strength*" and the second part involves the development of a "*TOWS table … to compare, contrast and combine Ts, Os, Ws and Ss, in various ways, so that action plans which, say, use one of the strengths to exploit an opportunity [will] emerge*" and guide strategic insight development (Coyle 2004, p. 89). The first part only of TOWS (i.e. SWOT) analysis is applied in this step of the methodology, while the development of an action plan and strategic insights support the final step of the methodology.

The identified gaps formed the starting point for workshops with stakeholders (CAL, G7 and HQ 1DIV) to (i) ascertain whether the stakeholders agreed, (ii) explore the issues in more detail and (iii) to stimulate discussion of related issues. Two SWOT workshops were conducted in August 2013: the first workshop involved five CAL staff in Puckapunyal and the second workshop three G7 staff in Victoria Barracks. Input was also sought from HQ 1Div and was released to us in September

2013. Input was also sought in regards to the interaction of the ALN with capability development processes, and interviews were conducted with DST Group staff involved with *'Diggerworks'* and the Senior Military Officer embedded in DST Group (Land Division) who sits on the Land Capability Battle-worthiness Board (LCBB).

Evidence to support of issues – Data Analysis using the CFA

In this part of the process, we conduct two types of analysis:

- ***Historical analysis*** on organisational responses to environmental changes to provide evidence for the issues highlighted in the previous step and to clarify/characterise them more fully. The data set is categorised by classes and levels of adaptation, as well as by the scales and areas of the organisation, highlighting deficiencies (defined within the CFA). During the review, the CAL provided information regarding the number of lessons and insights that have been identified over the lifespan of the Army lessons database (now called ALIAS)[31].
- ***Cultural perspective***. Although the focus of this methodology is on system analysis, clearly other aspects of organisational change/learning are important and may constrain the operation of adaptive processes. This is especially true of both social and cultural aspects. Any research on these aspects should be incorporated to ensure that any final recommendations are feasible and accommodate the culture and behaviours of the organisation in which they will be implemented. The Army Learning Organisation (ALO) team from the Land Division of DST Group have been studying the Army's organisational learning properties for a number of years. To garner insights from the ALO studies on the issues identified as a part of this review in

[31] Note that ALIAS has three levels: Observations, Insights and Lessons. Observations can be entered by any member of the ADF, whereas Insights are aggregations of observations that have occurred multiple times and will have significant consequence if not addressed, and Lessons are the highest level where actions have been implemented to remedy the issue.

relation to the ALN, workshop was run with the ALO team members. During the workshop we provided the ALO team a background brief on the methods and process employed in our review and then discussed each of the main issues and recommended actions in turn. The ALO team highlighted any constraints and other relevant information from ALO studies from a cultural perspective that added an additional dimension to review findings as well as often reinforcing them. We view ALO insights as a way of triangulating the ALN review results.

Synthesis of analysis leading to recommendations

This step culminates with a key set of recommendations to improve the adaptive processes. The SWOT analysis should lead to a list of the key issues that require amelioration and also support a comparison of the internal *weaknesses* and *strengths* of the adaptive process with the external *threats* and *opportunities* of the environment leading to actions to improve the adaptive processes. At this point the outputs from the data analysis are used to provide evidence for issues and to support the development of actions that are more focused. Actions are combined into strategic insights that are used to provide an indication of the main directions for change and to underpin the development recommendations.

Issues and recommendations triangulate input from the SWOT workshops, data analysis and social/cultural studies (Figure 24).

The synthesis will lead to clarification of the issues that have been identified during the gap analysis of the system diagrams and TOWS workshops. Results of the synthesis are:

(i) A list of explicitly expressed issues of the current system work supported by examples from historical and social/cultural perspective, and

(ii) A list of recommendations aimed at improving the adaptive system which are feasible and practical.

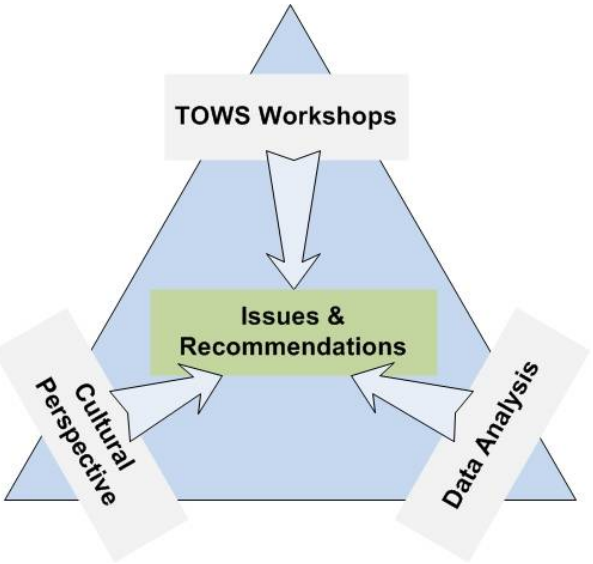

Figure 24. Synthesis of analysis

The final step of the synthesis is to communicate issues and recommendations with key stakeholders to obtain their feedback and acceptance.

3.1.3.4. Data collection settings

The ALN study was an ongoing project conducted by the DST Group for the Australian Army. The university researchers took an active role in this, helping to produce a designed and as-is view as well as analyse data from the workshops, historical examples from the CAL database, discussing cultural perspectives with the ALO team and synthesising analysed data together. During the review we conducted the first attempt to apply ideas of the CFA in practice, i.e., designed and as-is views were developed based on fundamental principles described in the CFA as well as during the analysis of historical cases of adaptation.

It was not possible for the university researchers to attend TOWS workshops due to classification that are the control of the researchers; however, all data from the workshops was available to the university researchers for the analysis.

3.2. Philosophical ground

It is known that complex systems do not comply with the reductionist way of thinking where the whole can be understood through the study of its parts. This implies the existence of non-linear interconnections among a system's parts leading to its overall dynamic. Thus, the review of complex systems is not a trivial task – dynamic behaviour makes it difficult to develop a unified approach to appraise them. It is acknowledged now that is some cases previous experience becomes problematic for predicting the future state and limits planning of complex systems – as a system changes along the way and previous rules lose their appropriateness. From this perspective, the objectivist view, where reality exists independent of cognition and that its laws can be discovered through a series of well-planned studies, can significantly limit research into complex systems. In contrast to this classical quantitative approach an analysis of complex systems should not focus on identifying 'the truth', but should aim at investigating *how and why a complex system behaves* leading to its better understanding and possible suggestions and recommendations for its improvement. Therefore, we suggest an approach to complex systems appraisal that is flexible and explorative rather than based on strong assumptions and a search for particular patterns. Thus, current research, being aimed at appraising adaptive properties of the complex military system, should take a *subjectivist* approach. By this we mean that we do not focus on identifying the parameters of an empirical system (that helps it to be adaptive), but rather explore *what makes a particular system adaptive* and *how it manages to maintain its adaptivity.*

3.2.1. Ontology and epistemology of the research

We start from the ontology of the research where we aim to position human beings in their external reality. By this we would like to discuss our perspective on their roles in engaging with the reality and, consequently, their role in the research. In other words talking about ontology we concern ourselves with *"the nature of social entities"* (Bryman 2012) or with *"the structure of the reality as such"* (Crotty 1998). Acknowledging existence of two opposing directions of thought, *objectivism* and *constructivism*, first we tend to place our thinking in the middle ground. This means that we acknowledge the fact that reality exists independent of people. However, it hardly means anything without humans who make sense of it through their interpretations (Crotty 1998). Therefore, giving value to how people interpret this reality we move our thinking to an ontological paradigm that is inherent to *constructivism*. Moreover, the whole idea of a complex adaptive system implies an active participation of CAS actors in creating the system itself and the reality around it. This strongly correlates with constructivism that *"asserts that social phenomena and their meanings are continually being accomplished by social actors"* (Bryman 2012). This view is in contrast to the objectivist perspective where it is believed that reality is autonomous and independent of its inhabitants. This leads to the next statement- that rules of reality can be studied and learned even if sometimes it is impossible to discover all of them. This is a strong statement since it implies the possibility of uncovering 'rules of universe' through continuous studies, while social activities play no role in the global order of things. Whatever scale of the research is taken (universe, society or organisation), objectivists argue that humans just follow rules and orders, while a system operates within its own laws (Bryman 2012). We do not wish to challenge beliefs and propositions that are made by fellow researchers. However, we do see our research as uniquely based on complex

systems and therefore people remain an inherent and integral part of the system since it is they who design, introduce and manage the system (an army in our case). We see the only way for the current study to learn about the behaviour of a complex system is through the people who can share their perception, knowledge and experience of how the system itself is built and what it implies. Moreover, despite the fact that such an organisation as an army is usually perceived as a highly bureaucratic and hierarchical system, we argue that to work effectively it must completely rely on its soldiers who are the front end of the organisation and who are trained and educated in such a way that they are forced to interact with, influence and develop reality (war is an extreme example of that). Thus, the current research views human beings as those who actively interpret and construct the reality around them, positioning the study within a *constructivist* perspective of an ontological paradigm.

Now we move to an epistemology that talks about *"what is (or should be) regarded as acceptable knowledge in a discipline"* (Bryman 2012). As it is known there are two ways to build knowledge – the first is based on natural science and another that *"respects the differences between people and the objects of the natural sciences"* (Bryman 2012). The first direction, known as *positivism*, follows objectivist paradigm of ontology that reality exists on its own and therefore can be examined through a number of tests using propositions that are based on facts and mainly on statistics. Moreover, positivists believe that principles and logic of science apply equally for both the social and natural sciences; therefore social studies can follow and apply rules of natural science to build knowledge. This includes precise procedures on how to conduct the research and eliminates any human influence on a system based on numbers and formulas (Neuman 2006). We see positivism as a top-down approach where people are studied through an understanding of how they

respond to external reality – external pressure is assumed to be much stronger than human mental processes and human ability to influence it (Neuman 2006). For the current research social interactions are crucial and play a special role, since through them common meaning is created, shared and the whole social system is shaped. Therefore, it is necessary to take an alternative approach to positivism – an epistemological paradigm that reflects constructivist thinking of ontology and defines an approach to be taken to construct the knowledge, namely *interpretivism*. This means that this research focuses on learning how people behave and therefore construct and shape their reality as it is *"intentionally created out of the purposeful actions of interacting social beings"* (Neuman 2006). It is not to say that reality is eliminated – on the contrary, an interpretive study is context dependent as both the reality and people actively influence each other. Using an interpretative approach we would like to learn what a particular context means to people and how they respond to and shape it acknowledging their experience, diversity, shared values and common behaviour. While approximation of human behaviour in a particular situation is always possible, in some instances it is hard to develop such a formula to explain the *why*, *what* and *how* of organisational change, and this research is an example of that. As well as an ontological constructivist direction an interpretative approach is close to the ideas of complex adaptive systems since emphasis is made on the systems actors, their rules of behaviour and interactions among them. Moreover, insights into systems work gained through the eyes of its managers and operators represent a valuable set of information that is used to develop new knowledge – the one that tells a story of particular case of organisational change implemented in a large semi-closed, hierarchical organisation that is placed under constant external pressure of adaptation.

3.2.2. Research methods: a case study approach

In the current research we utilise a case study approach that mirrors the interpretive nature of the study. We see a case study approach as *"a qualitative approach in which investigator explores a real-life, contemporary bounded system (a case) … through detailed, in-depth data collection involving multiple sources of information"* (Creswell 2013). To defend a case study approach we use Yin's reasoning for the choice of research methods expressed in the form of the research questions, control over studied events and the nature of the events (i.e., contemporary or historical) (Yin 2009):

- ***Nature of the research questions.*** The study of organisational change in the Australian Army is about *how* and *why* the system has adapted to new operational conditions. We are interested in exploring and understanding how a complex social system has changed and continues changing (through reviewing the past major change and its particular process of organisational learning). It is not impossible to gain this knowledge through survey or historical analyses as it requires a quite precise investigation of processes being utilised by people who operate the system. While some questions concern the numerical information of the system's work (e.g., frequency of communication and number of received responses) – they emerged during the interviews and workshops and answers on them were used as a supportive material to understand the adaptive properties of the organisation in general. The majority of questions cover actual behaviour patterns and reasoning behind processes being employed in the Army.
- ***Control over behavioural events.*** Obviously, researchers had no control over events being studied – organisational change occurs independent of researchers and all processes resulting from it are controlled and managed by the Army staff. We only had an opportunity to capture a

snapshot of a particular case of organisational change and adaptation as well as processes of organisational learning through engagement with people.

- ***The nature of the event***. While AAI and its particular outcome happened in the past, the research is not an historical study. On the contrary, it concerns a contemporary event that was studied at the same time as its outcomes were being revealed. The greatest distinction between historical piece of work and the current research is the opportunity that was used by the researchers to talk to people who were managing organisational change and who could then evaluate its impact and even propose further development for the whole organisation. Having said that, it should be mentioned that an historical overview of the change was used to gain background information, conduct purposeful sampling of the interviewees and workshops participants, and to structure interviews.

In general we perceive a case study approach as the one that helps us to engage with military personnel and get understanding of the organisation, its way to change and learn – that is perfectly fit with the main objectives of the case study approach that *"arise out of the desire to understand complex social phenomena"* (Yin 2009).

3.3. Research Limitations

This research has a number of limitations:

1. A single case study in time and space – the case of organisational change being conducted in the Australian Army in 2009. Moreover, the study of the change is not a full review of the changes being implemented – only a general plan and its implementation (AAI) as well as one outcome (ALN) have been appraised.

2. We acknowledge that data provided to researchers represents an edited version of actual reality since some aspects touched on national security and were not available to us.
3. We have captured perspectives only of major stakeholders who were involved in organisational change, i.e. a 'foot soldiers' were not interviewed as it was beyond the project's scope. However, it was sufficient for us to examine how the change was designed and implemented and see the results in order to understand how the complex organisation adapts to change.
4. Theory used to structure interview and conduct the analysis of organisational change (Conceptual Framework for Adaptation) is not complete, but provides plenty of scope to conduct the study and analyse data.

Chapter 4
Data analysis

The goal of this chapter is to discuss data being collected during the research. For the data analysis we utilise the Conceptual Framework for Adaptation (CFA) as an instrument to appraise organisational change. To discuss collected data the chapter is divided in five main parts (Figure 25):

Section 4.1	describes the process of data analysis – AAI interviews.
Section 4.2	discusses the main aspects of the organisational change: how it was designed, and implemented and what it has achieved so far.
Section 4.3	provides a discussion of the ideas of organisational adaptability; we aim to extract some general adaptability characteristics of the Army.
Section 4.4	appraises of the processes of organisational learning through an ALN case study; ALN analysis also demonstrates how one of the AAI goals was implemented.
Section 4.5	synthesises of the data analysis.

As a reminder, the research is based on a number of interviews (19) with senior, mid-ranking Army Officers, and external to the Army people. It should be noted that the data analysis was checked by Dr Matthew Richmond (DST Group), however, it still represents author's analysis and interpretation of data.

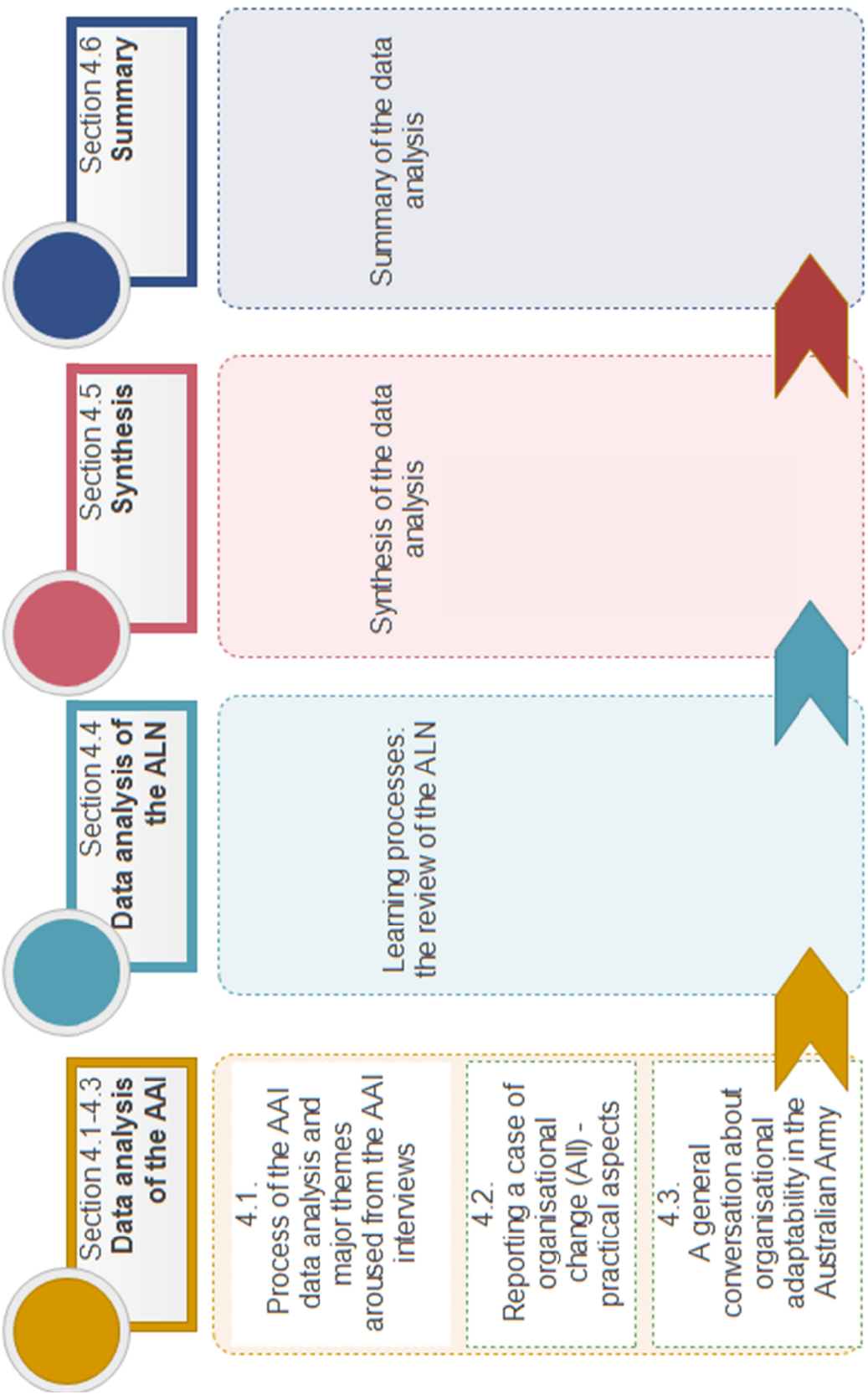

Figure 25. Data analysis structure

4.1. The process of data analysis – AAI interviews

The analysis of data collected during the AAI interviews resulted in a number of themes that were further grouped in bigger categories (Figure 26). We utilised three stages of coding – open, axial and selective (Neuman 2006, pp. 461-464):

> **Open coding** is *'a first coding of quantitative data in which a researcher examines the data to condense them into preliminary analytic categories or codes'.*
>
> **Axial coding** is *'a second stage of coding of qualitative data in which a researcher organizes the codes, links them, and discovers key analytic categories'.*
>
> **Selective coding** is *'a last stage in coding qualitative data in which a researcher examines previous codes to identify and select data that will support the conceptual coding categories that were developed'.*

Stage 1. Open coding (themes identification) helped to conduct an analysis of the preliminary interviews and identify interview themes. While the interview structure was used to conduct interviews analysis, it was acknowledged that the process of analysis should be flexible enough to allow for the emergence of themes that were not directly linked to the interview questions. Therefore, the process of open coding used the interviews structure, but also included an identification of themes that were not initially part of it.

Stage 2. An Axial coding process (identification of themes connections) was used to group themes into the main categories and link them to the interview structure. Moreover, axial coding helped to link interview themes to the theory being utilised to review the AAI. Thus, there were two ways of axial

coding – the one that reflected the interviews structure and another that linked themes to the theory.

Stage 3. Selective coding (identification of special themes) was done to focus more on the cultural aspects of the Army's adaptability and the generalisation of theoretical ideas that emerged from the interviews.

The process of three stages coding helped us to organise themes around bigger categories (Figure 26):

- **Particular adaptive process (AAI).** These are themes that answer interview questions and give a general picture of the AAI. However, three additional categories were included as they can add value to the AAI review. These categories are 'next steps', 'triggers for change' and 'Army's readiness for change'. In general these themes present an analysis of a case of organisational change as represented by the AAI.

- **Organisational adaptation (mechanistic view or general properties of adaptability).** The analysis of the interview allowed us to identify a number of themes that tell us about the general level of the Army's adaptability. These themes provide examples of classes and levels of adaptation, include aspects of organisational adaptability that cover ways and means of preparing the Army for the future by making it adaptable to a continuously changing environment.

- **Organisational adaptation (social real-life system perspective).** Themes devoted to the cultural insights add extra dimension to the mechanistic view of organisational adaptability. They underline the fact that the Army is a social organisation, in which all processes (even perfectly designed ones) are managed by people. Culture, attitude, relationships and individual behaviour are crucial aspects of an organisation. This category also includes theoretical underpinnings that contain more abstract ideas of

an army. These themes are discussed in Chapter 5. The further description of the interview themes reflects these main categories.

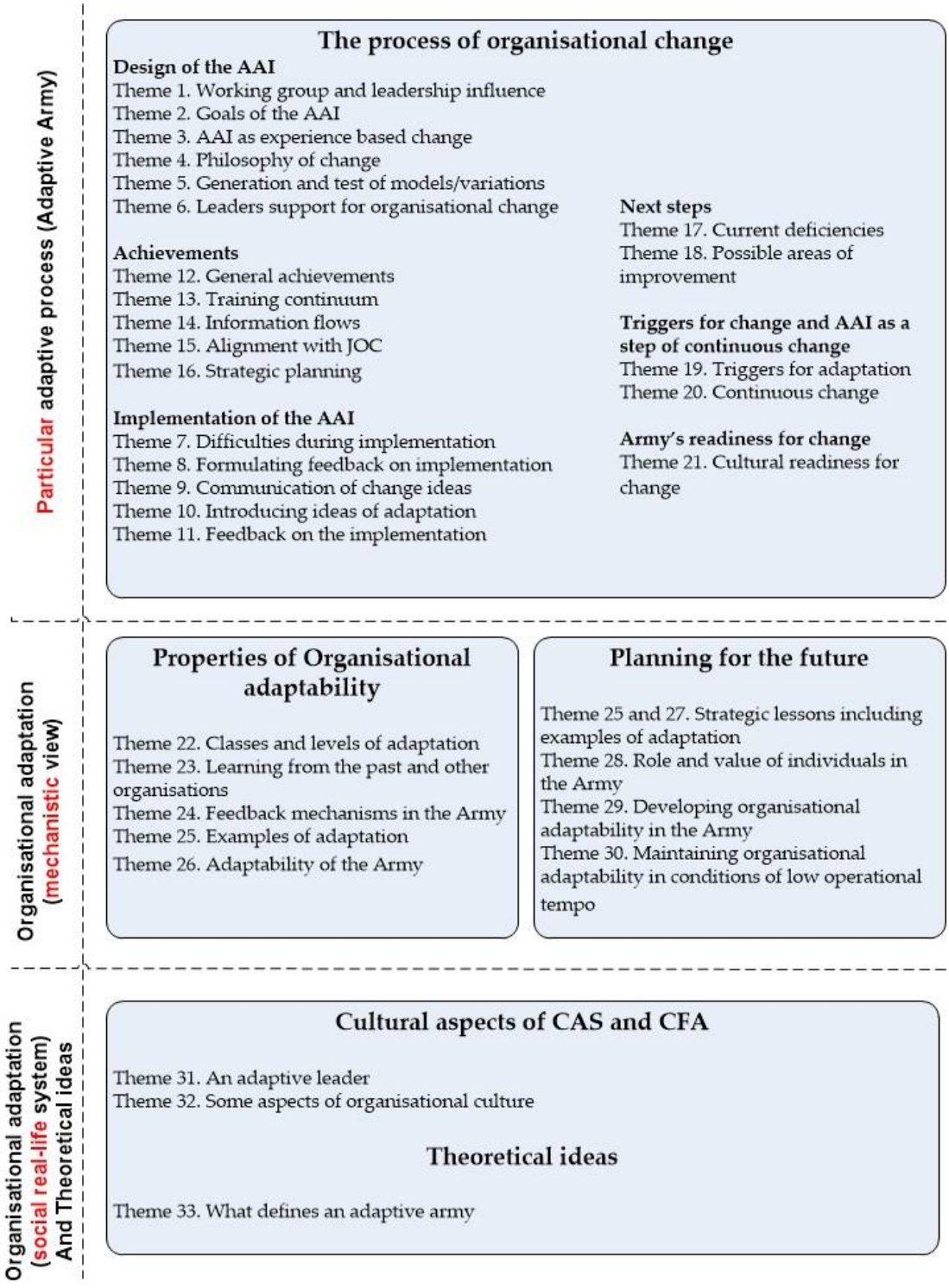

Figure 26. Interview themes

4.2. The case of organisational change: AAI

Reporting of data of the actual case of organisational change is based on the history of the Adaptive Army Initiative (AAI) written by Dr Breen (Breen 2014) and information available from the AAI interviews. Without repeating the story provided by Dr Breen we would like to focus on aspects of the organisational change in the Australian Army using the Conceptual Framework for Adaptation (CFA) as a way to understand and learn how it was conducted. For this purpose we utilise the learning cycle of the CFA (Figure 13, p. 105) and its four main steps – Act-Sense-Decide-Adapt. These steps allow us to describe the organisational change as a process of iterative learning and adaptation and appraise how the adaptation worked in this particular case (Figure 27). However, it should be noted that we allowed themes to emerge in a flexible manner; this means that utilising the CFA we did not take a rigid approach to classify information from the interviews strictly in accordance with the CFA. On the contrary, we used CFA to guide the data analysis in a way that it helped to structure our understanding of the organisational change. Thus, we are able to tell a story of how the change was sensed, designed, implemented and appraised without discussing how well processes of organisational adaptation worked.

It should be mentioned here that data available from the interviews (as well as from Dr Breen's report) is very comprehensive. Therefore, we took a narrative approach to describe the process of change instead of discussing every theme being identified during the data analysis. For that we combine themes into bigger categories that are consistent with the steps of the ASDA loop. Where appropriate we provide quotations from the interviewees to contextualise most of the themes reported in this chapter (in accordance with the permission to openly quote obtained before interviews).

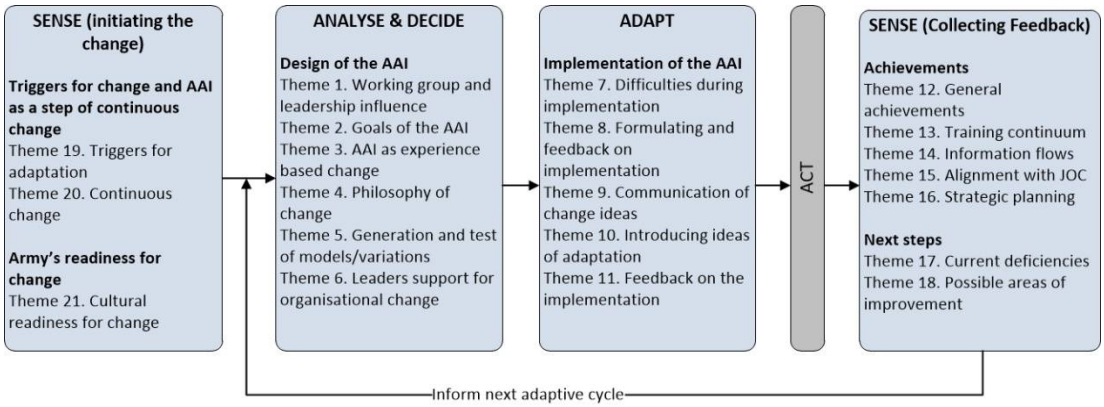

Figure 27. A particular case of organisational adaptation – CFA perspective, ASDA loop

4.2.1. Sense or initiating the change *(Themes 19-21)*

- **Triggers for change and AAI as a step of continuous change** *(Theme 19)*

The first part of the change description concerns the factors that forced the Army to change as well as how the change is viewed in general terms. Thus, we start from the way the Army sensed a need for change with a particular emphasis on *drivers for adaptation* (refer to the section 2.5.2.1 in Chapter 2). Then we discuss the fact that the change within the Army is a continuous and ongoing process that allows the organisations to be efficient in its business. Finally, we discuss the readiness of the Army to change as an important factor for successful adaptation.

Prior to discussing our findings we would like to remind what triggers of adaptation are. A system that fulfils its fit for purpose, measured through its sensors, can remain its state and does not change. Events that initiate a change process can be different by their nature, external or internal. However, as it was revealed during the interview with the academic being involved into the process of theoretical conceptualization of the AAI – external influence has the most significant disturbance on the system as it provides a real-life feedback about the correspondence between the system's

state and its fit for purpose. Negative outcome of this comparison usually triggers or initiates the change – subject to the system's intelligence to recognize the need for modification.

Three main external factors initiated the AAI:

(i) **External trigger – Joint operational command and control.** Dr Breen's paper describes an external factor – the establishment of the Headquarters Joint Operations (HQJOC). This was a significant change for the whole Australian Defence Force (ADF) that led to a new way for the three services (Air Force, Navy and Army) to operate together in response to the government needs. In particular, a Joint Headquarters was created in order to introduce a common point of command and control (C2) in deployment – one point of C2 takes the assigned forces from Air Force, Navy and Land Commanders and prepares them into a task-organised force. From Army's perspective this meant internal processes of forces training and generation should be re-designed in such a way that they '*allow to prepare land forces at mounting bases in sufficient time for them to be ready for mission-specific rehearsals before deployment'* (Breen 2014). However, a series of reviews of the current (at that point) Army structure revealed its inefficiency in regard to the new ADF requirements. This theme was also confirmed during the AAI interviews.

(ii) **External trigger – operational experience (fit for purpose)**. AAI interviews emphasised another way to perceive the need for change which is operational experience of the Army's commanders. By 2009 the Army had been participated in operations for several years and recognised a significant shift in operational conditions; transformation of warfare from conventional to irregular with fast adversary learning and adaptation. Moreover, the Army was involved in *continuous* operations that had been forcing it to sustain a high operational tempo. Real-life experience of continuous ongoing operations of a new type highlighted the inefficiency of the manner that the

organisation operated. In other words, the Army that had not been changed significantly since the Hassett Review in 1970[32] was actually designed for circumstances and conditions that were different in which it was now. Therefore, processes and structure did not sufficiently correspond to the contemporary needs as was revealed by real-life test (feedback) through real operational experience.

> *"I do think at its heart there was a deep unhappiness that our adversary was learning faster than us, and our ability as an organisation to adapt was far too slow and that we were losing lives in casualties as a result" MAJGEN Paul Symon (Ret.)*

> *"In the modern battlefield what we realised in Afghanistan and in Iraq is that our soldiers are moving all over the place, it's, it's a modular structure so we're cherry picking different people from all over the place. And when we pull them together under the arrangement guess what, they look like Frankenstein, it was a shit fight" Interviewee E*

(iii) **Internal triggers** were not as important as the external ones, but they also played a role in initiating the change. In particular, there was recognition that the Army had an overcomplicated and bureaucratic structure of the training and education system, and poor long term planning processes. This has been reinforced recently by a study conducted of Army's Training and Education system by the current Director General Training Brigadier Mick Ryan (Brigadier Ryan, Mick 2016).

- **Continuous change** *(Themes 20 and 21)*

Despite the fact that there had been no significant structural change in the Army since Hassett Review, the AAI cannot be viewed as a step of organisational adaptation that is isolated from other programs being

[32] Hassett Review "moved the Army from its traditional state-based structure to an organisation that began evolving to centrally managed delivery of command, training and sustainment functions for operations" (Breen 2014).

implemented. It represents only one case within a continuous change process. The interviews underlined that the AAI is a continuation of change that was introduced by Gen Hassett in 1970. In other words, the course that was determined by the Hassett Review was maintained in other programs being implemented to improve the Army work such as Hardened Network Army (HNA)[33], the Enhanced Land Force (ELF)[34] that preceded the AAI.

Moreover, the need for continuous change led the Army to design the next steps of adaptation post the AAI – Plan Beersheba[35] and Building on Beersheba[36].

[33] The Hardened and Networked Army (HNA) (The Hardened and Networked Army 2005): In response to response to the demands outlined in the Defence Update 2005 the Army initiated the program to "increase the size and firepower of the land force, improve the protection provided to our troops, and allow them to communicate better on the future battlefield". The goal of the program was to develop the Army that is "capable of providing a broader range of options and forces that can be employed for longer and if necessary, in more lethal scenarios… across the range of likely tasks, from humanitarian relief efforts to the more dangerous warfighting operations"; thus, it is to be "structured, trained and equipped accordingly". The driving forces related to the changes in operational conditions that is characterised as complex.

[34] "The Enhanced Land Force initiative increased the size of the Army by two battalions, accompanied by facilities upgrades, and increased the size of the Bushmaster fleet to more than 400 vehicles. The total strength of the Army would rise to eight battalions — two mechanised, five light and one commando. Approximately 2600 additional personnel were to be recruited" (Breen 2014).

[35] "Plan Beersheba was announced by Government in November 2011 and re-affirmed in Defence White Paper 2013, is Army's modernisation plan to maximise the effectiveness of the 36-month Force Generation Cycle and provide the widest range of sustained and effective Land Force capability for directed requirements within assigned resources. Army's Force Generation Cycle ensures that combat Brigades, specialist capabilities and part time forces consistently train together. Army's conventional deployable combat forces move through three 12 month phases in a 36 month cycle. As Plan Beersheba is implemented, Army will take significant steps to becoming a digital, networked force equipped with improved B vehicles and ready to execute a comprehensive armoured fighting vehicle upgrade. Army's work force will be more flexible, enabled by role-specific physical employment standards and commonality of force structure between full and part time elements" (*Plan Beersheba* 2015).

"So I don't see the Adaptive Army in isolation, I see it as part of a continuum of change that probably started in my opinion when General Hickling, as Chief of Army, gave a briefing to the National Press Club just prior to East Timor" MAJGEN Greg Bilton

"I just see the Adaptive Army as a complement to the trajectory that Army was already on. An improvement to the way Army arrayed itself and used its resources to be ready to go on operations" MAJGEN Paul Symon (Ret.)

Every step of the continuous process of organisational change focuses on correcting deficiencies of the Army in response to changing environmental conditions and ensures that the Army has required capabilities to response to the government needs as well as is structured, trained and equipped in accordance with the operational conditions. The importance of the continuation of change is also emphasised in Dr Breen's paper who mentioned that the change leader aimed to maintain the direction set by the HNA and ELF.

- **Army's readiness for change – cultural aspect** *(Theme 21)*

General acceptance of organisational change plays a crucial role in its successful implementation. In the case of the AAI, the organisation was ready for change – key players acknowledged the need for a new cycle of adaptation. However, some resistance existed; in particular some senior leaders did not want to lose a high-ranking Officer position that was the likely consequence of the proposed changes. The resistance concerned with

[36] Building on Beersheba: "Army's Plan Beersheba, currently being implemented, has changed Army's force structure to provide a wider range of ready, sustainable land force capabilities. It has enhanced the efficiency of the Army Force Generation Cycle, and better integrated the regular-reserve-civilian total force in the generation and deployment of land force capabilities. But while this has set the conditions for the transition from an analogue to an information age Army, further development is necessary to continue modernising the Army. There is a requirement to look and plan to build on Beersheba" (*Building on Beersheba: The Future Army* 2015).

high operational tempo that the Army needed to maintain at that time and the fact that experience of high ranking Officers was important to keep. Eventually, the restructure, that was part of the AAI, maintained the number of high-ranking Officers with some refocusing of their roles.

Thus, it is possible to note that acceptance and success of change depends on readiness and openness of an organisation for it. Moreover, as was indicated by from the AAI interviews a *modern dynamic environment requires an organisation to have a culture that perceives change positively and as a continuous process of constant evolution*.

4.2.2. Analyse and Decide *(Themes 1-6)*

In this section we discuss aspects of organisational change that relate to its planning. A short review of the organisational design process from a CFA perspective will be provided (discussed in section 'Step 2 and Step 3: Analyse and Decide' of the Chapter 2). Starting from the philosophy of change and its goals, we move to a general overview of how the change is designed and, finally, we describe the role of leadership.

- **Philosophy and goals of organisational change** *(Themes 2 and 4)*

In general the AAI was a structural change that was aimed at developing a new structure of the Army that would better correspond to the operational requirements. As the organisational change was driven by the need to improve Army's ability to efficiently or rapidly provide forces to the ADF and sustain operational tempo, the initial goal of the AAI was to improve the process of forces preparation for operations. However, during further review of Army's needs, it was recognised that this goal could not be viewed in isolation to other organisational processes and therefore a bigger scope of change was developed. As a result, the AAI had seven strategic areas of

improvement and development. The AAI interviews confirmed that all of the strategic areas were regarded as *equally important* and represented a *holistic view* of the Army's needs at the time of the change design. Moreover, during the interviews reinforced that the goals of the AAI are *still relevant and represent areas to focus to make the Army adaptive* (raise, train and sustain functions).

More generally the AAI was not designed in such a way that it provided ready-to-implement solutions to meet Army's needs. On the contrary, it included *an overall vision of the directions for change and improvement*. Thus, the philosophical underpinnings of the AAI included the *delegation of ownership of decisions* to people at lower organisational levels across the whole Army:

> *"Part of the Adaptive Army construct was not just shape, but it was about a mindset of thinking, about delegation of responsibilities, about making people think through the problems, about looking for their own answers, about making their own subordinates work in the same sort of way" LTGEN Ken Gillespie (Ret.)*

> *"Remember, Adaptive Army was not a solution. It was a process to nut out better solutions and then implement them" Interviewee B*

This approach mirrors concept of mission command, which represents a way of command in militaries. It combines centralised and decentralised execution of actions within military operations across all levels. Such an approach allows for freedom and increases speed of actions conducted within pre-defined constraints. The practice of the mission command is based on a number of principles such as understanding by subordinates of commander's intent and desired effects of the mission, and understanding of operational context and constraints. Then subordinates decide and act on their own within boundaries of delegated freedom to achieve objectives of the mission (*Joint Operations, Joint Publications 3-0* 2011).

This was achieved through providing a general direction of change and encouraging personnel to work on solutions rather than giving direct orders and answers. Such type of *a work-in-progress process* was introduced to the high ranking and later to the mid-level Officers and aimed at identifying and implementing better ideas for change. Delegation of decisions supported an increased commitment to the organisational change across the whole of the Army.

- **Design options organisational change** *(Themes 1, 3 and 5)*

Dr Breen's paper contains a detailed historical account of how proposed AAI changes were developed. Here we provide only general points of this process that emerged from the interviews and being confirmed by an historic overview by Dr Breen. However, some findings of the AAI interviews show significant socio-cultural aspects of the change process that compliments the historical discussion provided by Dr Breen.

The design of the proposed changes under the AAI were primarily developed through *discussions between high-ranking Officers* (a working group that consisted of one-star generals) that had an opportunity to analyse possible models for a new organisational structure in an open and constructive manner. The discussions included a review and test (wargaming[37]) of the different models (variations) of change under a range of possible future scenarios (low operational tempo, no operational tempo and higher operational tempo). Importantly, while the design process was stated to be open, the AAI interviews suggested that there was a strong influence from the senior leaders and the AAI design was *based on the*

[37] Wargaming represent a set of "analytic games that simulate aspects of warfare at the tactical, operational, or strategic level. They are used to examine warfighting concepts, train and educate commanders and analysts, explore scenarios, and assess how force planning and posture choices affect campaign outcomes" (*Wargaming*). In the context of the current study wargaming refers to white board modelling of possible organisational structures.

practical experience of high-ranking Officers involved in the conceptualisation process. However, other sources of information were also used: the theoretical ideas of CAS and organisational change as well as experiences of other armies (particularly, the US and British). Notwithstanding, it was acknowledged that theoretical ideas did not have a significant contribution and it appears that a comprehensive study directly comparing the Australian Army with other armies was not conducted. Finally, there was no specific evidence of explicitly extracting information from the existing lessons databases to inform the design of the AAI.

- **Role of leadership in the process of organisational change design** *(Theme 6)*

The AAI interviews revealed an important factor that impacts on the success of any significant organisational change – namely that it had the leaders support. It was acknowledged that in order to design and implement the change and achieve a positive outcome it was crucial to gain the support of upper command. In case of the AAI, senior leaders fully supported the change, its design and implementation.

> *"The real change develops out of people who have got leadership responsibilities deciding that how they are performing is not good enough and change needs to be made. In my own case, my own experience is that you had an incoming Chief and a Deputy Chief and a group of like-minded senior Officers who question the efficiency and effectiveness of the Army that they were a part of and realised that change was not only absolutely necessary but had to be done during their tenure" LTGEN David Morrison (Ret.)*

> *"You had to get some buy-in and some people did not buy it right to the last. But it is a pretty powerful combination when you are getting a clear message from the Chief of Army and the Deputy Chief knowing that they are behind this and very supportive. Like for me it is a one-star general trying to get*

all the one-stars generals through these, so making it very clear that I have got a lot of support behind me with these endeavours, but also saying to them that their views, their opinions you know are really important to getting this right" MAJGEN Paul Symon (Ret.)

4.2.3. Adapt *(Themes 7-11)*

In this section we describe change implementation. We review it from the CFA perspective discussed in section 'Step 4: Adapt' of the Chapter 2. Starting from the way ideas of the change were introduced to the organisation, we highlight issues being faced during the implementation of the change and how feedback was formulated and collected on the implemented change.

- **Communication of the ideas of change** *(Themes 9 and 10)*

The Army's senior leaders stated that the goals of the AAI were well articulated and that a vision of change, including the areas of focus, were clearly expressed. In particular, the AAI had 40 initiatives that were distributed across 5 directions of change with 4-8 initiatives for each direction.

The AAI was a significant organisational change initiated and designed from the top of the organisation. Communication of its ideas to various organisational levels was done differently. As the change was designed by senior Officers the top organisational level was well informed about the change. The mid-organisational level was not as well informed about the narrative for change, which led to a poor general understanding of the change and its goals. Lower organisational level (junior Officers and soldiers) were again not well informed of the ideas and rationale of the organisational change as it was assumed that the change had no influence on them or their work. Thus, mid and lower organisational levels perceived the AAI as a

something that was introduced and implemented from the top, so they had little or no ownership. This contradicts the change philosophy of power delegation from top to bottom since poor communication of the ideas for change and the underlining rationale can potentially create misalignment of the actions at lower organisational levels with the higher level goals.

> *"We communicated the Adaptive Army Initiatives to the right people, selling it to the one-star level commanders and making sure that the senior leadership were all taken along on the ride particularly where we wanted. What we were doing with Adaptive Army which was just restructuring the headquarters. And it was only going to affect that group of people" COL Mick Tucker*

A term *'adaptive'* is a part of the program name and one would believe that it has a special meaning linked to the goal to create a truly adaptive organisation that is capable of adjusting itself in response to changing external conditions. Thus, we were interested in the extent to which the concept of organisational adaptation was introduced to the whole of the Army. As we discovered, organisational adaptation was not the core idea of the change in the beginning. The term *'adaptive'* came later when there was a need to find a badge name for the change that would generate buying-in. Moreover, even though the concept of adaptation was introduced at the later stages of the change design we were interested in how well its main principals were communicated to the organisation. We found that ideas of adaptation were not introduced effectively to the Army even at the senior Officers' level. Consequently, there was a level of misunderstanding of the essence of adaptation, poor application of its ideas at all organisational levels and inconsistent distribution of the ideas of adaptation across the Army.

> *"You have got to sell people on what the idea is and not what the term is and I think that is part of the problem is that we were so interested in the term of just being adaptive that we never really sold people on what it actually means. How does*

that actually change how we train and those kind of things – we never did that" Interviewee B

"The biggest thing was that the Adaptive Army was not adequately communicated to people so there were a few people who kind of understood it. But to go further than that, at the next level down that has responsibility for implementation, there was no means to actually get them to understand what was the theory behind it, how could they be supported in implementing it, what was needed to be approached or done differently from what they had always done. It was just that was not addressed. So a lot of them would have interpreted it as just another layer of high level concepts superimposed on business as usual, and so they would have reverted back to their normal ways of doing things very quickly because I think they did not really understand what needed to change and why and therefore they did not embrace it and own it" Dr Anne-Marie Grisogono

- **Difficulties during implementation of the change** *(Theme 7)*

In general the implementation of the AAI went smoothly and there were no significant issues, delays and setbacks. The biggest challenge was the fact that the Army had to implement the change while maintaining a high operational tempo. In other words the Army needed to operate at full capacity and implement the changes at the same time.

- **Feedback on implementation of the change** *(Themes 8 and 11)*

One of the main principles of adaptation is to develop routine processes that allow continuous tracking of the progress towards the desired changes. In other words, active ingrained feedback loops. The goal of that is to ensure that the change has achieved what was planned as well as identifying further areas for refinement of the implementation plan. With this in mind part of each AAI interview questioned if the feedback on change had been collected and appraised.

While tracking feedback is an important part of adaptation, it is more effective when it is linked to the high-level goals and the description of the desired outcomes. As mentioned above the AAI goals were articulated in 40 initiatives that were distributed across 5 directions of change with 4-8 initiatives for each direction.

A detailed framework for obtaining the outcomes from the implementation of the 40 AAI initiatives was developed; however, we found that only one review was conducted to track the progress (by the time of the AAI interviews, 5 years after the framework had been developed). That review of progress focused on appraising the Army's adaptability at three organisational levels – tactical, operational and strategic. The general conclusion of the review states that the AAI had a positive impact on organisational adaptability. Importantly, the review was initiated from a mid-ranking Officer at Army Headquarters (Army HQ) and in the end there was no significant interest or support from senior leaders to advance the review findings, since other priorities existed at the time.

Again formulating clearly what the organisational change is expected to achieve is important. In more practical terms it is necessary to develop a list of measures that indicate change success or failure. The interviews indicate that while the goals of the AAI were expressed in 40 initiatives, there were no clear measures of their success or failure provided across organisational levels. Furthermore, we were interested if feedback loops existed in the Army as they represent a mechanisms support assessment of achieved outcomes and make it possible to compare them with the initial intention. The previous review demonstrated that there were feedback loops for some initiatives and that they functioned well initially but fell away later, as presumably Army's focus moved into other areas (e.g., Plan Beersheba and high operational tempo). The review showed that three goals were

continuously monitored through naturally inbuilt adaptive cycles; these goals relate to Personnel Management, Materiel Management, Training and Education. The two goals that got the least attention were C2 restructuring and knowledge management. However, during the previous AAI review there was an attempt to attract attention to C2 restructuring, something that became a big part of the AAI. The initial plan was to monitor and evaluate whether the C2 restructure had led to the expected advantages, identifying its second and third order effects as well as to map possible directions for further improvement. The importance of reviewing the C2 restructure was discussed and acknowledged by senior Officers, but it did not progress, because it was not one of the major priorities at that time.

4.2.4. Sense or collecting feedback about change *(Themes 12-18)*

The AAI interviews provided a general appraisal of the achievements of the AAI and feedback on the implemented organisational change. From an organisational adaptation perspective, the interviews themselves represent a part of the process of continuous improvement and adaptation. To be consistent with the AAI goals, we structured our findings across its five main directions. Below we discuss the AAI achievements in different areas: general impact, training continuum, information flows, alignment with the Joint environment of the ADF and strategic planning.

- **General achievements of the AAI** *(Theme 12)*

It is clear, even from general observation that the AAI had had a positive impact on the Army. In particular it had improved the Army's efficiency in generating operational capabilities and had facilitated the support of several years of consistent operations. Moreover, the AAI underpinned the Army's next significant change – Plan Beersheba that has led to a continuous force generation cycle of three similar, multi-role combat Brigades that can better

support ongoing operations and a clearer view for government of the capabilities the Army can provide. Despite inconsistent communication and a lack of understanding of the ideas of adaptation across all organisational levels, the AAI created conditions for a psychological and sociological shift in people's minds that led to a better understanding of the principle of adaptation.

> *"The Adaptive Army allowed us to have a far better utilisation of troops to task, it gave us more troops available for operations, we were not feeding a duplicative cumbersome training system at home. What we put in place actually served Army really well for what was a challenging twelve years of consistent operation" LTGEN Ken Gillespie (Ret.)*

> *"In the Adaptive Army construct I think the biggest positive would actually be saying 'adaptive army'. It was a psychological and sociological shift in people's minds which then got further reinforced by going into the reporting requirement for individuals – adaptation" BRIG Peter Clay (Ret.)*

- **Achievements of the AAI – training continuum** *(Theme 13)*

As was outlined previously one of the main goals of the AAI was to create a single training continuum that would integrate individual and collective training and support more efficient force preparation. The standing up of a Headquarters Forces Command (HQ FORCOMD) led to a single Headquarters managing the entire Army training continuum. A single training continuum led to the removal of extra layers of bureaucracy and achieved improvements in collective training. On the other hand, it was still an open question whether improvements in collective training were achieved at the expense of individual training? It was suggested by some interviewees that more emphasis was placed on developing collective training capabilities, with individual training receiving only second order attention. A clear theme from the interviews was that the link between Army HQ and HQ

FORCOMD was not strong enough in relation to individual training and that improved strategic guidance should be provided.

Another outcome of the single training continuum was the development of a major collective exercise called EX HAMEL[38]. It aimed at developing and evaluating the collective capabilities of the Army through a comprehensive collective training and exercise once every year. The AAI interviews highlighted the importance of EX HAMEL; however, it was further stated that it mainly focused on the development and evaluation of capabilities that are commensurate with conventional warfare and not capabilities designed for complex dynamic scenarios that are likely within the future operational environment. This statement was later confirmed in the Army HQ publication on its vision of the future Army (*Building on Beersheba: The future Army. Discussion paper two: A strategic approach to collective training* 2014).

> *"There's a bit of a debate about whether practicing war fighting capabilities, conventional war fighting capabilities prepares you for other events. I still argue that is the most difficult form of war fighting, but there are aspects of stability operations and peace keeping operations that you still need to train for, even outside of the war fighting experience, because there are subtleties around civil engagement, indigenous forces, things that we've learnt over probably the last, particularly strongly the last 15 years that you have to train and practice" MAJGEN Greg Bilton*

> *"I think the cost of the model we have got now [single training continuum] is there's not enough emphasis on individual training" MAJGEN Greg Bilton*

[38] "Exercise Hamel, which takes its name from a battle fought in France in 1918, has been designed to develop, confirm, and evaluate the foundation war fighting skills" of Readying Brigade (*What is Exercise HAMEL?* 2012).

- **Achievements of the AAI – information flows** *(Theme 14)*

Organisational learning is a crucial mechanism of adaptation. The AAI aimed to formalise learning processes across the organisation and develop an Army Lessons Network (ALN) to achieve structured lessons collection and dissemination. It was confirmed that the ALN supported improved information flows across the Army. The ALN consists of three temporal learning loops (short, medium and long) and interviews included questions about each of them to investigate how well they functioned, including whether they were integrated well together to contribute to the overall organisational learning.

The AAI interviews identified the following: there is common agreement that lessons processes within short lessons are very good; they are fast and efficient and provide necessary information to improve the force preparation of the next rotation (currently preparing to deploy). In regard to medium lessons loops the interview themes indicated that the processes are effective; however, there is still room for improvement. There was general acknowledgement that not a lot of strategic lessons had been collected. However, it was further suggested that strategic lessons require much more time to reveal themselves; therefore, it would be difficult to evaluate the effectiveness of the lessons processes at the strategic level.

More generally, the ALN is an example of a positive and adaptive organisational culture as this concept emerged from a bottom-up process and the development of a formal structure of lesson processes that was supported by senior Officers. We also identified obstacles for the further development of the ALN, which included an organisational culture that has no tradition to search and exploit lessons information systems and a bureaucracy that slows down the information flows – both of these obstacles reinforced and

encouraged the informal network that is extensively used for the distribution of information.

> *Actually it [ALN] was not one that I [Chief of Army who introduced the adaptive army] imposed on them down, it was one that came up and this is the way, we think, that we can do it and so it was actually developed inside the organisation not something that was pushed down to them. And the most important part of it was they believed that it was the way that we should go and it had a strong resonance with me so it came out. So it was one of those areas that once you empowered people to think and that they knew you were looking for bright ideas, that was sort of the stuff that came up from the bottom" LTGEN Ken Gillespie (Rtd.)*

Note: as a part of the current study we conducted a detailed review of the ALN to appraise organisational leaning at different levels. Refer to the 'Processes of organisational learning (ALN case study)' section of Chapter 4 for more details. The ALN case study was also utilised to demonstrate and discuss the applicability of the CFA to the actual processes that support learning in the organisation (section 'CFA and its applicability' in the Chapter 4).

- **Achievement of the AAI – alignment with JOC** *(Theme 15)*

As was highlighted previously, one of the external drivers for adaptation was the significant change in the ADF that aimed at developing Joint forces commanded by the Headquarters Joint Operations Command or HQ JOC rather than by the Service Chiefs. As a result, questions about the current role of HQ 1DIV were raised in the interviews. The AAI interviews suggested that there was no duplication of roles between 1DIV and JOC; however, the relationship between the two headquarters was still developing. Moreover, it was suggested that there was a cultural issue relating to the way HQJOC was perceived; in particular, it was viewed as a separate Defence entity rather

than one that unites and coordinates the three services (Air Force, Navy and Land).

> *"And DJs [Army's representatives in the Joint Operations Command] and 1 DIV [as a part of the JOC structure] emerged out of decisions from the past, their existence and where they are at the moment are a statement of the current reality but not necessarily a testament to our vision of what we needed in the future" Interviewee E*

> *"And so a lot of people are still thinking in single service terms, the army training system, the army thing whereas the goal and the vision is about the joint Force" Interviewee E*

- **Achievements of the AAI – strategic planning** *(Theme 16)*

Strategic planning is viewed as a crucial capability of the Army particularly as it prepares itself for an uncertain future. The AAI interviews indicated that the Army was more focused at the tactical level rather than at the strategic level. It was suggested that the nature of the work and the type of personalities that manage the organisation had led to this outcome. There was a bias towards the selection and development of Army personnel to be action-oriented and in the majority of cases to have strong tactical experience which was not properly reinforced by the ability to think at a strategic level. However, to overcome known deficiencies in strategic planning, the AAI refocused some positions held by senior Officers and developed a new role, Head of Modernisation and Strategic Planning – Army (HMSP-A). The HMSP-A supports the Army to strategically plan for the future without focusing too heavily on current issues. Over five years the new function of HMSP-A helped the Army to better embrace technological change and improve its links to capability development and acquisition. As has been mentioned before, it is not a trivial task to appraise strategic planning as any actions taken at this level require time for the outcomes to become clear. However, what has been observed is the fact that the Army has recognised

the importance of strategic, long-term planning and it has implemented structural and procedural changes to better support it.

> *"That is something which I have always noticed about Army personnel, is that they will do the best they can with what they have, but that sometimes can undermine the strategic arguments to get more" Interviewee F*

> *"It is a big step for an army but we needed better generals and we needed better politicians who had a better strategy at the time. So I think that is, the answer to that question is if you find a way to put the risk up with the guy who can make a difference" Interviewee F*

> *"I advocated for it myself because the Army was stuck in the paradigm of today and tomorrow, not doing strategic planning, so it needs to do that. But the way we've done it is now in a way where it has become its own little empire and it's not well-aligned with the here and now of Army" Interviewee B*

- **Thinking about the next steps** *(Themes 17 and 18)*

Adaptation is an ongoing process that never stops. Every preceding cycle of adaptation leads to a new cycle that can focus on the same areas of improvement or choose a new direction. Therefore, viewing the AAI as a single point in a continuous process of adaptation, we were interested in what could be improved in the Army in the future. Thus, this part describes interview themes related to deficiencies and possible directions for the next adaptive cycle.

There is a general acknowledgement that the area of *individual and collective training* requires further attention. It was suggested that it was necessary to conduct a review of the training and education system, including areas of possible improvement of personnel development processes and better integration of individual and collective training. It was suggested that the individual training and current development models were too prescriptive,

discriminating against people with talent and limiting the Army in reaching its full potential. Moreover, there was an idea that it was important to educate people in such a way that they could properly use their capabilities and skills in, or adapt to, an uncertain environment. Finally, it was believed that better usage of technology, including the introduction of simulation-based training, on-line training and empowering individuals to initiate their own educational opportunities, could open up new opportunities for developing capabilities and support more flexible learning.

> *"Combining individual and collective training under a single command made good sense as a single Commander was responsible for all training and the structure supported feedback (e.g. from BDE Commanders into training establishments) and integration between individual and collective training. Notwithstanding, there is room to improve the Army Training Continuum by considering how individual and collective training can be better integrated. Options to improve individual training include; a more de-centralised training model where appropriate and more on-line training" MAJGEN Shane Caughey*

> *"But I think it also gets back to our education and I think there needs to be programs that people, if you do not give people an educational opportunity they will just go and find their own. But if there was a well-structured professional military education program, you could probably give people those skills as part of their promotional path" Interviewee A*

Information represents an important asset in any organisation. *Knowledge sharing* is an important area for the Army as the informal network of knowledge sharing is very strong but the formal area is not, being overly bureaucratic and under-utilised.

Another key theme related to the Army's alignment with other groups and agents, both external and internal to Defence. It was suggested that the Army needed to further integrate with the Joint environment, clarifying the relationships between the Army and HQJOC and increasing major exercises

with other services. Finally, it was suggested that the Army should continue developing relationships with other external organisations within the ADF.

> *"There is no duplication between HQ 1Div and HQ JOC; however, the next big step for Adaptive Army is developing better links between Army and Joint Planning" MAJGEN Shane Caughey*

More general recommendations related to the continuous review of the progress of organisational change. It was acknowledged that there was a need to conduct a review of the AAI outcomes as a part of the continuous review of organisational adaptability. Moreover, the goal of the review was not simply to monitor how well actions had been implemented, but to check if the outcomes were still relevant or required amendments. For example, a review of the Army's force structure may provide insights into the efficiency of the current structure within current and future strategic operational environments.

> *"We need to continue to ask ourselves, are we adaptable, have we got the right fore structure, have we got the right, the units doing the right training? Are we equipping them in a way that actually delivers a, the capabilities that not only the army but the ADF need in the future? Do we have the means by which we can continually come back and realistically and pragmatically objectively assess our progress?" LTGEN David Morisson (Ret.)*

4.3. General characteristics of organisational adaptability in the Australian Army

Previously, in the section 4.2, we reported aspects of the AAI organisational change by applying the ASDA structure to analyse interview themes. This section provides a more abstract discussion of the properties of organisational adaptability of the Army. We have used the CFA for the

analysis of these properties. In particular we describe relevant attributes of the Army which we classify using (Figure 28).

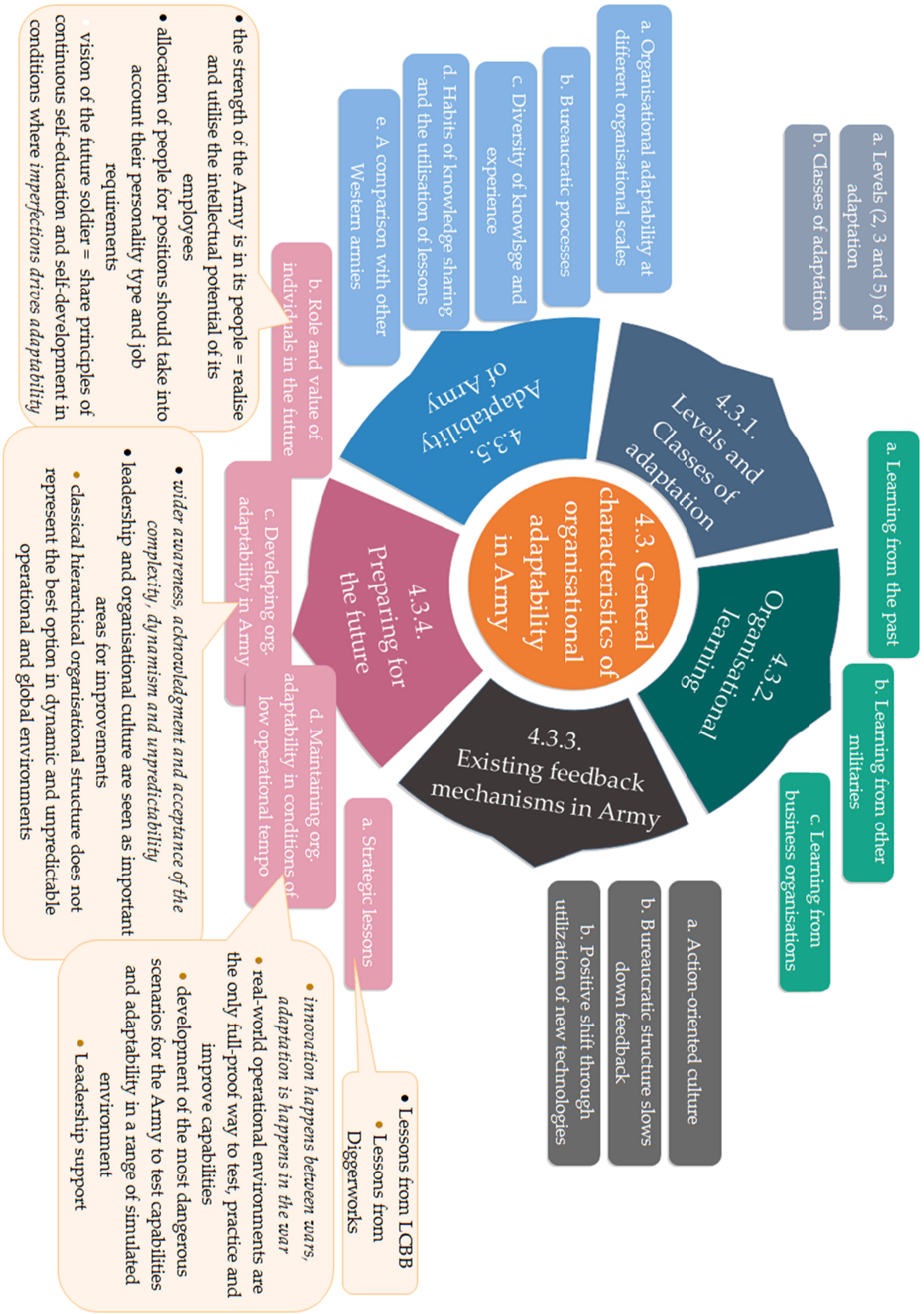

Figure 28. Discussion of general characteristics of organisational adaptability in the Australian Army

Section 4.3.1 describes classes and levels of adaptation

Section 4.3.2 describes the Army's ability to learn from the past and other organisations,

Section 4.3.3 describes existing feedback mechanisms

Section 4.3.4 describes the way the Army prepares itself for the future,

Section 4.3.5 describes and a general appraisal of the level of the Army's adaptability.

4.3.1. Classes and levels of adaptation *(Theme 22)*

In the literature review, we discussed the *levels* and *classes* of adaptation and why they were important mechanisms that supported adaptability. Whilst levels of adaptation are an advancement of an adaptive process, classes show how well the system may respond to different types of external change. We further showed that levels and classes of adaptation are interlinked, as each class of adaptation can be applied at different levels (refer to section 2.5.8 in the Chapter 2). However, we found it difficult to apply levels and classes of the CFA in conducting a comprehensive analysis of the AAI program due to practical issues – the AAI interviews generally provided high-level insights and did not provide the detail necessarily. Notwithstanding, we identified themes that simply illustrate classes and levels of adaptation (Figure 29).

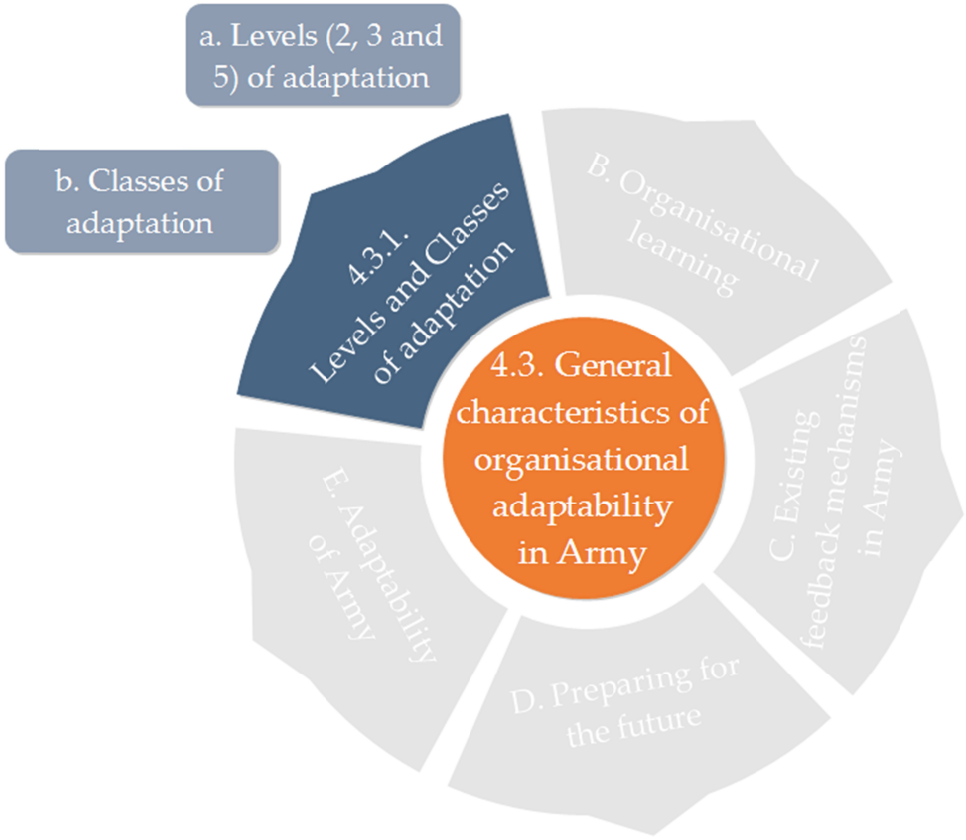

Figure 29. Describing cases of levels and classes of adaptation

a. **Levels of adaptation.** Recall that the adaptive cycle (based on the ASDA loop) represents a process that assists the identification of the need for change and the development and implementation of an appropriate action. But what type of action should be undertaken? The development of a new capability or optimisation of existing processes, the improvement of internal processes of adaptation, change of goals and proxies that describe them, or the reposition of the system in an external environment? The answer is often hidden in an understanding of the levels of adaptation. We now describe the examples for each of level of adaptation that we identified in the Army. Note: there are no observable examples for levels 1 and 4.

(i) *Level 2 of adaptation: learning.* Continuous change implemented through a series of programs such as: the Enhanced Land Force, Adaptive Army Initiative and Plan Beersheba are examples of level 2 of adaptation. The goal of this level is to develop new models of behaviour

and/or add new capabilities with a bigger objective to improve the overall work of the organisation. Change initiatives such as the Enhanced Land Force, Adaptive Army Initiative and Plan Beersheba included changes that aimed at responding to increased operational tempo. In other words, all of them aimed at changing the way the Army operated in order to improve its general ability to fight and better meet government requirements. Importantly, adaptation at this level does not question underlying assumptions or goals – it attempts to adjust the system modifying its ways of operating (through changing the way of work or introducing new capabilities). This does not challenge the programs objectives, which remain the same; in this case to defend the nation and provide timely, well-prepared capabilities to meet government needs.

"So it was really the structural changes [Enhanced Land Force, Adaptive Army, Plan Beersheba] needed to take advantage of those technology developments and to respond to the perception of increased tempo and increased threat levels and stuff like that. So it was adaptation of what we would call Level 1 – actually Level 2 because you are changing your capabilities, but it was changing your capabilities to deal with what you expected the future to be" Dr Anne-Marie Grisogono

(ii) *Level 3 of adaptation: learning-to-learn.* Level 3 demonstrates an ability of the system to conduct self-evaluation in order to improve internal processes. Moreover, it questions the system's ability to adapt by putting properties of adaptability under review. Interestingly, the AAI interviews demonstrate *that there is a lack of critical thinking leading to an inability of the Army to conduct a series of necessary reviews aimed at checking how well the Army's systems work*. Further discussion of this finding with the academics involved in the theoretical conceptualisation

of the AAI revealed that many organisations lack the ability to evaluate themselves, undermining a move from level 2 to upper levels.

"the higher levels – the Level 3 and Level 4 … that didn't happen, and because that didn't happen there was no follow through" Dr Anne-Marie Grisogono

"We almost have got a sense of deniability that we have got anything wrong. And it is at a level where we are so comfortable in our structure that we just do not see sometimes that we should be changing it. So we have changed the size of the sections, we have done a lot of things in the fighting combat role to get things right and how we fight and how we organise and all those things. My question is now, are they well commanded? And are they most optimally supported at the command, at the unit command level? That is the issue, I think under that level there, we have done well and we do it well, we change it regularly what they look like. We do that all the time, it is that level up that I am not clear on that we are doing it right and I do not know that we have got a good system of, of internally looking at that" COL Mick Tucker

(iii) *Level 5 of adaptation: co-adaptation.* The Army has a number of examples of adaptive processes at level 5 of adaptation. We cannot judge how well internal adaptive processes operate within each other (and consequently are unable to develop an adaptive architecture), but we can perceive how the Army employs its adaptability to improve its place in a broader context – i.e. the Joint environment of the ADF where three services (Air Force, Navy and Land) are integrated. This suggests that the Army is continuously trying to adjust itself as a part of a bigger complex adaptive system (CAS). It is clear that the three services are still perceived as separate entities, while they actually are one defence organisation with a common goal to deliver an integrated Joint capability. To achieve a better level of integration within the Joint Forces, it is important to have the same level of understanding of the Joint environment among all three services. Furthermore, among the

three services the Army sees itself as the one that is most ready to be integrated into a mature Joint Force. A step forward towards a truly Joint Force is supported by the fact that the current organisational change, the AAI, was positively accepted by the other services. Moreover, improvements in the collective training processes that led to the development of EX HAMEL, supported the next step forward and the invitation of the other services to participate in that training. This is a positive example of the way the Army has positioned itself to operate more effectively within the ADF. Going further, the Australian Army also interacts with other armies from around the world (especially ABCA – America, Britain, Canada and Australia – embedding liaison officers) to share experiences. This demonstrates its ability to adapt even in a wider context outside of the ADF.

"A lot of people are still thinking in single service terms, the Army training system, the Army thing whereas the goal and the vision is about the Joint Force. So we come to training, let me use training as an example. A lot of what we cannot do in training is because a lot of it is actually about joint education, right? And we end up with a, perhaps, an inelegant connection between the single service and the joint effort, they are moving at different paces, they often have a different focus, they are not well integrated" Interviewee E

"In the early days of Hamel [major collective exercise] because we had a close relationship with the other two service Chiefs - we also got them to change their individual and collective programs so that we had fast jet aircraft meeting the Chief of Air Force's training requirement providing support to our exercise. In other words we put them in the same battle space for their own individual purposes but we, so for Army Officers in that case it was often the first time that they had the ability for tanks, artillery, Air Force and noble gun fire support all to be coordinated in support of an activity. So in that case we were introducing Army Officers for the first time

to the bigger Joint picture than they had been" LTGEN Ken Gillespie (Ret.)

There are other examples that confirm the Army' ability to change in order to improve how it works with other organisations. As was discussed earlier as a result of the AAI, the Army refocused the work of some senior Officers and developed a new senior role for the strategic planning (Head of Modernisation and Strategic Planning – Army or HMSP-A). Over five years, the new function of HMSP-A assisted the Army to increase its influence on technological change through improvements in its ability to define its capability needs and requirements and justify key acquisition projects. Defence capability development and acquisition organisations are external to the Army; however, they have a direct impact on the Army's strategic planning processes. Improvements in the relationships between the Army and Defence capability development and acquisition organisations (former CDG and DMO – now CAS Group and SP&I Group) are still limited by other factors that do not depend on the Army entirely. This means that the Army does not operate in isolation; thus, to achieve improvements it is important that other organisations are capable of changing with the Army simultaneously[39].

"HMSP-A role: (a) significantly improved Army's ability to plan for the future and communications with CDG/DMO, however, it needs to further develop links and influence in non-Army projects, (b) lack of integration of projects restricts Army's ability to be connected into the Joint environment (e.g. to provide improved situational awareness, say by connection to Air platforms). Increased digitisation may assist in alleviating this issue" MAJGEN Shane Caughey

[39] The recent changes, which have occurred, with the closure of CDG and DMO, and the standing up of CAS Group, SP&I Group might have impact on the relationships between the Army and these organisations. However, it is not justified in this research.

> *"Its [projects] integration, and neither Army, DMO, or CDG are particularly good in this space. Now, if I can give you a really good example, we created the land networking integration centre because we could not get the communications projects to integrate. So they were still delivering in stovepipes on separate arm schedules, and not looking holistically at cost. So, in some ways I think we were wasting money, and it is probably a dangerous thing to say in Defence, but the reality is, a more coordinated effort, I think would have meant better spending of money… I think the other key areas is exerting our will in regards to getting better – continuing that process of our relationships with DMO and CDG to get better evolution capability, and then better coordination and integration of projects, I still think that piece needs more work" MAJGEN Greg Bilton*

The final example of collaborative work of different organisations and services aimed at achieving a common goal is the program called *Diggerworks* (Cebon & Samson 2013). Prior to the *Diggerworks* program the analysis of equipment acquisition processes demonstrated that the same scheme was used both for procuring a tank or a soldier's equipment. This scheme, as well as similar approaches from the allies, is very conservative and risk reductionist. On the other hand, a modern soldier requires a lot of equipment that should be adjusted to suit various circumstances. However, this limits the possibility to design one 'size fits all' set of equipment and requires a process of incremental improvements that would be very long if conducted through the traditional acquisition process. Thus, in response to these challenges and borrowing from the experience of the US Army (Agile Acquisition), the ADF in collaboration with other defence and non-defence organisations (incl. the DST Group) launched the *Diggerworks* program. The aim was to speed up the process of procurement of future soldier combat systems (SCS). Now *Digggerworks* is acknowledged to be a success story that achieved positive outcomes: it improved a soldiers' safety, it allowed for innovation and timely delivery of the necessary equipment. It was based on

strong collaborative work that brought subject-matter experts (including Army personnel) to one table and allowed for an open and productive discussion. From an adaptation point of view, *Diggerworks* represents a positive example of adaptation that resulted in practical outcomes as part of adaptation cycle.

> *"Yeah if you look at it as a bit of a seed. I think it was a seed and we chose an area that was probably the easiest thing to do and there was some political imperatives about it as well in the sense that Australian industry was involved and providing the bulk of the equipment. So you had a combination, you know: DSTO came onboard (and you probably know more about that than I do), DMO, and then you had industry in the room as well. And it started to allow us to evolve capability and it set a bit of an example. Later Land75 started to provide equipment so that we could look – and it did not happen with the first lot of dismounted systems but the second lot are being worked through Diggerworks, so that we are building systems that are properly integrated" MAJGEN Greg Bilton*

b. **Classes of adaptation.** As was shown previously, classes of adaptation represent a *supportive infrastructure* for the adaptive cycle. The CFA describes classes of adaptation as different types of reaction that the system can generate in response to various external disturbances. For example, the system can be *flexible,* meaning effective across a range of tasks. The system can also be *agile* that allows it to dynamically manage the balance and weight of effort across all lines of operation in time and space. A *resilient* system can recover in a timely manner from damage caused by an external event. Finally, a *responsive* system can rapidly recognise a new threat or opportunity and develop a response in a timely manner.

During preparation for the AAI interviews we discussed the conceptualisation of the AAI with key subject-matter experts. This helped uncover the importance of the classes of adaptation as well as highlighted

difficulties that related to the process of their analysis. In particular, we found that the analysis of the classes of adaptation was linked to the review of a number of historical cases that revealed the existence and quality of the *supportive infrastructure*. Another approach was to model a possible situation and try to predict the way the system would respond. Finally, analysis of the classes of adaptation is also possible through a real-life test of the system. However, any of the ways mentioned to collect information are problematic and time and resource consuming. Moreover, it was not possible to conduct any of above during the AAI interviews, so the following example of the classes of adaptation is based on a simple analysis of the AAI data. This limits our understanding of the Army's *supportive infrastructure*; however, it does provide some insight.

Here we provide only one class of adaptation – the Army's *responsiveness* to operational requirements. As was demonstrated previously a key impact of the AAI was the development of a new role for the Army's strategic planning (Head of Modernisation and Strategic Planning – Army or HMSP-A). The Army's responsiveness is linked to the HMSP-A role – the development of the LCBB (Land Capability Battle-worthiness Board) that allowed the Army to speed up (improve) the process of urgent equipment delivery to the war theatre and avoid the thorough, slow capability development process. Again, before the LCBB it was uncovered that high operational tempo and an innovative enemy led to the necessity to provide soldiers in the field with updated, high-tech equipment. However, the existing processes of equipment acquisition involved long bureaucratic processes that were not able to provide the necessary 'tools' to soldiers in a timely manner. Thus, there was recognition of the need for equipping soldiers with new tools and issues with their delivery led to the Army developing a new board that would improve the responsiveness of organisational processes and break

unnecessary links with the bureaucracy of the ADF. The LCBB incorporated similar principles as the *Diggerworks* program and is responsible for ensuring that the Army's needs for urgent equipment acquisition are met. In other words, the LCBB is an example of the Army's adaptive action that shows its ability to recognise the need at tactical and operational levels and develop a response to improve capability.

Unfortunately, our understanding of the Army's ability to successfully respond to different external threats (or recognise opportunities) is limited by this single example.

> *"The other thing, benefit that came out of HMSP-A during Caligari's time, was our response to operational urgent requirements and delivering equipment into theatre, which met emerging threats, and I think the work done, frankly between DMO, CDG and ourselves was very collegiate" MAJGEN Greg Bilton*

> *I remember in getting into the design of that [LCBB] - very much saying for an organisation full of committees and all of that, it was made very clear that when we have got a problem set or when we get something from theatre of a lesson learnt or the like, this LCBB has to be able to have around the table subject matter experts who can see, who can speak to the problem at hand. I remember you know making the point: I do not care if it is a private soldier, I do not care if it is the most junior scientist - if he is the expert you know in this particular problem then rank is not the issue around the table. And I do not care what ranks are sitting around the table, I just want the right expertise. So in a hierarchical organisation it I guess was trying to confirm that fact that we have got to be more agile here and rank does not mean that you are the font of all wisdom, I want the subject matter experts around the table to solve problems" MAJGEN Paul Symon (Ret.)*

4.3.2. Organisational learning *(Theme 23)*

In this section we appraise how well the Army learns from the past as well as from other organisations. The definition of adaptation underlines its reliance

on past experiences as a way to extract successes and failures of the system in order to modify its future actions. In other words, adaptation demands systems to develop an ability to recognise how well actions have worked in the past and whether they will contribute to the future success or require modification. This leads to coupling past experiences with current needs and generating a solution suitable for the future. Moreover, learning can occur from the experiences of systems that are similar. Thus, during the AAI interviews we were interested in whether the Army has the ability and habits to learn from its own experience as well as from other military and non-military organisations. We summarise a general approach that the Army has in this area (Figure 30).

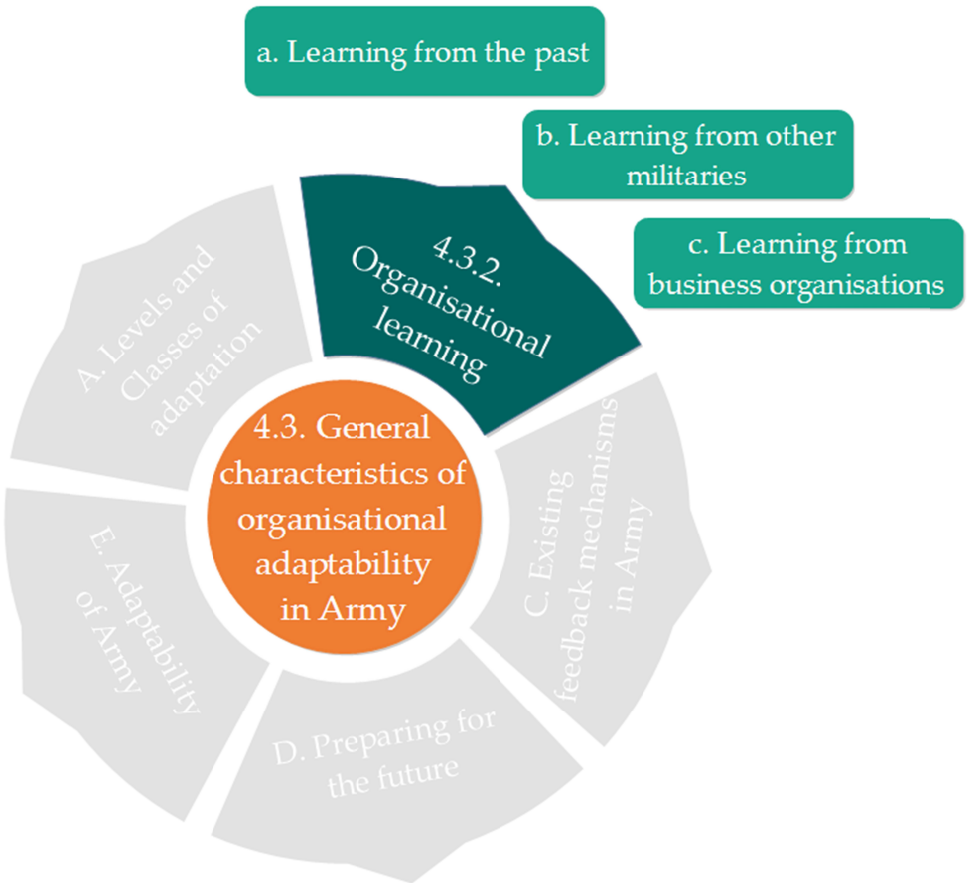

Figure 30. Organisational learning in the Army

a. **Learning from the past.** First, it was acknowledged that learning from the past is a necessity for such an organisation as the Army. However, it was

further confirmed that the history of the Army's activities is often not taken into consideration for the design of future actions. It is seen as an issue in the lessons learnt area, where people lack a habit of learning from organisational history, a habit of asking themselves if a similar action has been tried before, if it worked and what lessons are available from the implementation.

> "Ignorance of the past, dismissal of history, or simply distortions of recent events have resulted in disastrous choices by statesmen, political leaders, and generals. But that has not prevented successive generations of rulers and their political and military advisers from ignoring the lessons of history and marching down the road to disaster" (Murray, Williamson 2011b, p. 15).

Second, another obstacle of organisational learning, which emerged from the AAI interviews, is that the Army's centralised decision-making undermines its ability to learn from the experience of its employees. This fits with obstacles from the ALN study that the impacts of lessons are mostly bottom-up and at the tactical level with a limited impact on the strategic domain. Here we mean the ability of the Army to learn from the experiences of its personnel and feed their insights and recommendations to top management with a desire to improve the organisation in general. This is further reinforced by the findings related to social-cultural aspects of the Army's work.

> *"One of the lessons I think we have been learning [before the Adaptive Army] is we never delegated enough, what was happening is that we were sending young people overseas and Corporals were doing truly exciting and meaningful things in operations and then being brought back to Australia and treated like they were idiots and centralised decision making and command again" LTGEN Ken Gillespie (Ret.)*

> *"So, one of the big failings in lessons learnt, we apply them, is people fail to do their history. What has been tried before, did it work, what did we learn by that, it is very rarely done.*

Why did things fail? Before we launch off and do something in the future?" Interviewee E

b. **Learning from other military organisations.** Another area we covered during the AAI interviews relates to the Army's habits in regards to learning from other military organisations as they represent a valuable source of information. It is acknowledged that learning from experiences of other militaries is important. A good example of the Australian Army learning from other militaries is the application of the US Marine Corp approach to building an adaptive system that was implemented in the Adaptive Warfare Branch (AWB[40]) and the *Diggerworks* program. However, it was also underlined that the direct comparison, as well as the straight forward application of the experiences of other armies (e.g. US Army), can be problematic as these organisations have a different culture, history and environmental (geographical) conditions for defence of their nations. Learning from other militaries has a strong relationship with the fifth level of adaptation and the Australian Army[41].

"And it was mid 2000's, we were, the US were also going down that path with design so we, in some ways we led and partnered with the US to do that piece [Future Land Warfare concept that preceded the Adaptive Army]" MAJGEN Greg Bilton

"Yeah, Diggerworks is about the ergonomics, how we carry loads. So that again was a project that was, I will say, plagiarised from the US Marine Corp grant works. It was all about the soldier's assistant, making sure that what we are making them carry they can carry and they carry it in the most comfortable

[40] "Adaptive Warfare Branch (AWB) was set up within HQ 1st Div to manage the Short Learning Loop on its behalf. The AWB focus is on supporting the deploying force preparation and tactical lessons. The AWB was set up to implement data collection, analysis and dissemination as well as validation processes, including the development of supporting tools, to better aid the preparation of the deploying Units" (Musil 2011).

[41] Although this finding may appear in contradiction to the theme described in the section 4.2.2, which relates to the design of the AAI, it actually describes the ability of the Army to learn from other militaries on its ongoing business rather than developing change design.

means possible so that endurance is not affected. So we have, we the Australian Army have drawn on some really good ideas from the US over the years which means we have not had to do them ourselves necessarily" LTCOL Chris Goodall (Ret.)

"I think we need to be careful though that culturally we are two very different nations [the US and Australia] separated by a common language. So we picked something up and go, can do that and it makes no sense to us at the end of the day - not that we would ever admit that but we are not born out of the same fabric… I think there are environmental aspects to the States that we do not experience here in Australia. There is harshness to their continent that we have no idea. It is not until you live there and you go – it is cold or it is hot and we are having those seasons and we are having to cope environmentally with just living in that, we do not have that. I think culturally we were not born out of civil war, revolution, American Civil War, slavery. We do not have the sort of faith systems that are inherent in American culture" LTCOL Anita Rynne

c. **Learning from business organisations.** Finally, we tested how the Army learns from other organisations, non-military in particular, since a huge amount of research has been published by different organisations that could be extremely valuable. Thus, from this current research perspective, it is interesting to assess the amount of effort the Army invests in seeking new, advanced knowledge to inform its improvements. The AAI interviews indicated that the Army has a practice of sending its employees to external business organisations (e.g. General Electric, IBM, Deloitte) that provides employees with a chance to learn from these organisations. Besides general knowledge management, embedding Army personnel in a diverse range of other organisations leads to insights being gathered on processes and practices providing different views of the world that in turn broaden Army's thinking.

"We send people out to General Electric and IBM and all those sort of spaces… We are now doing that – sending them off to

Deloitte, IBM, and some other places. Well it opens people's minds. It is a positive step. Bring that in and got this through" BRIG Peter Clay (Ret.)

4.3.3. Feedback mechanisms in the Army *(Theme 24)*

Our perception of adaptation starts from the adaptive cycle, which is closed by reflection or feedback. Feedback is a powerful tool that allows the systems to assess whether the adaptive actions have first been implemented and, second, achieved the desired outcomes. Thus, we appraised the Army's feedback mechanisms. The ALN review revealed many feedback loops that are open, consequently, actions are implemented but as they are not tracked, mechanisms are not put in place to refine and improve upon them. Although the ALN case study focused on the formal learning processes, the AAI interviews focused on behavioural patterns that the Army has in relation to the value of feedback (Figure 31).

a. **Action-oriented culture.** First, it was revealed that organisational culture in the Army is *action-oriented* which leads the organisation to focus on developing a set of practical actions to ameliorate immediate issues at the expense of focusing on long-term improvements. As a result, as soon as an action is implemented to counter an issue, the Army switches its attention to the next issue. This approach limits the Army's ability to support proper feedback mechanisms as it is assumed that the implemented adaptive action has provided the desired effect. Having stated that, it should be noted that the Army does *verify* if the action has been fully implemented but does not follow-up on its impact over time.

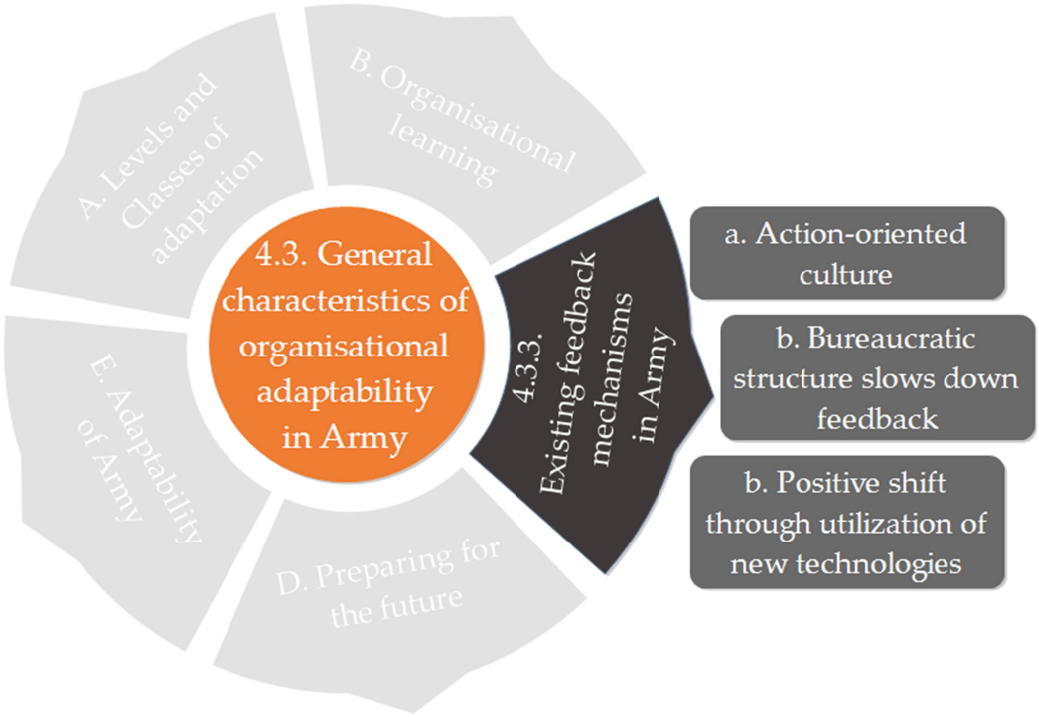

Figure 31. Feedback mechanisms in the Army.

"So you make a decision, you carry out an action… You track on then you move on to the next one. That is the way we are trained all the way up to, I mean including our senior sirs. You think of how many things would be on their table every day, so the Chief of Army deals with personnel issues all the way through to operational issues. So he has got so many things and so you can imagine he is focused on it, done. Next one, done. And he has almost forgotten about the first one by the time he has finished the second one. That is the way we are trained to deal with issues. So it is given a problem, come up with a solution, implement it, crack on" LTCOL Chris Goodall (Ret.)

"In a mature operationally focussed Army when you're really talking about being ready to go on operations, you need to be as good as you possibly can be, then the incentive is to test, fail, prove those weaknesses and go for it, but when you're not, when you're in complex peace as opposed to complex war, that changes, and the model to be successful in the system is more a zero defect culture and people will go to extraordinary lengths and be rewarded for governance success, putting their resources towards that, far more than they will be from

producing an extraordinary result in a collective training exercise with live fire weapons". BRIG Peter Clay (Ret.)

b. **Positive shift in feedback mechanism and bureaucratic structure.** Second, the AAI interviews confirmed that a positive shift in feedback mechanisms has occurred. It is linked to the technical side of the way feedback is collected – for example, a new technological means of communication such as surveys, e-mails, social media (blogs, forums, Twitter, Facebook) and etc. allow the Army to speed up and reinforce feedback mechanisms. However, it is still done through formal bureaucratic command and control structure that eliminates some advantages of new communication tools.

"So what we have used for our change approach is chain of command. So we have tried to message through those organisations, access through surveys and emails where there are mechanisms now for soldiers and everyone to email everyone, and if necessary without actually identifying themselves. Also we have had all sorts of town hall type meetings and events where people get a chance to talk. And no one can say that the solider of today, does not have access to social media and a multitude of mechanisms. So if there is deep dissatisfaction or misunderstanding on these issues, it would not break out. Now just stop for a minute and listen, that is the noise of the complaints from the Army about these issues. So part of it is listening to that, it is not our panacea but at the moment what we have done to Adaptive Army and Beersheba is we are actually two-thirds of the way through the most significant change in 50 years and it is going okay. And there is not too many complaints" Interviewee E

"It is about control as opposed to mission command and freedom right now. I mean that will change. That is how it sort of sits. So that has a big impact in an Army that is fundamentally a hierarchical organisation and you see that playing out at the moment in the Army with its ability to rapidly change. There is a centralisation of decision making in play that stymies the organisation's freedom to rapidly adapt and change, then that

is also reinforced by a suffocating bureaucracy – no, it is not that bad, but you know what I mean" BRIG Peter Clay (Ret.)

4.3.4. Preparing for the future *(Themes 25, 27-30)*

An adaptive organisation is one that is able to respond effectively to external threats; however, other important aspects include its ability to recognise opportunity and think and plan strategically for the future. Below we demonstrate how at the time of the AAI interviews the Army perceived its own past experience and attempted to draw a picture of the future. We discuss the following areas: possible strategic lessons extracted from the recent 10 years of operations in Afghanistan, thoughts about the role of individuals in the future Army, thoughts about the way to prepare for the future, and ideas about possible changes to operational tempo (particularly in regard to the withdrawal of forces from Afghanistan or refocusing from one operational environment to another[42]) and, therefore, refocusing the Army's work to maintain its 'fit and readiness' for possible future actions (Figure 32).

a. **Strategic lessons** *(Theme 25 and 27).* During the AAI interviews we discovered a number of areas from which the Army could extract strategic lessons. The observation relates to the recent 10 years of experience of the Australian Army in Afghanistan.

It was demonstrated above that LCBB and *Diggerworks* represent positive examples of organisational adaptation. These two success stories can be a source of strategic lessons. First, it is worth capturing and documenting the processes both programs employed, since they are obviously adaptive cycles

[42] Note that at the time of the interviews there was a relatively common belief that the ADF could be headed for a period of low operational tempo; however, this is not what has occurred or what is likely to continue. Nonetheless, the insights on maintaining readiness during periods of low operational tempo are valid.

that work well. Their strong and weak points can be beneficial in the future should one need to roll out similar mechanisms again. In particular – how they were developed and introduced, what aspects were reinforced, how they were measured and evaluated, what knowledge and skills were required, and, more importantly, what lessons were learnt. Capturing aspects of each program's work requires the extraction of tacit knowledge of the programs' participants and transferring it into explicit organisational knowledge. Second, the LCBB and *Diggerworks* program led to the introduction of new equipment and soldier combat systems for one particular theatre – Afghanistan. However, it is believed that a detailed examination of the equipment and systems being delivered through the LCBB and *Diggerworks* could provide deeper insights. In other words, there is an opportunity to critically think about what can be left as a part of the 'soldier battle package' on a permanent basis, i.e. not theatre specific.

Figure 32. Discussion on areas to focus for preparing for the future

For example, some equipment (e.g., Unmanned Aerial Vehicle or AUV) could be introduced to individual training on a permanent basis. It is further suggested that more general lessons from Afghanistan can be reviewed in the same manner – from a bigger picture perspective.

> *"I think there are two parts to it. One, I think there is still a job to do by the LCBB … which has the records and understanding of why things were purchased and for what purpose, to actually finalise that work and determine what should come into service permanently in the Army and what we should discard as just being Afghan-centric, or that operation centric. So there is a body of work – now it might have – I would check this because it might have been done, but my – now at the far end of the tree on the very end branch, I am not seeing that … So I think that's a body of work that must be done. The next thing, I think – the processes themselves" MAJGEN Greg Bilton*

Both suggestions about possible strategic lessons relates to the discussed areas of the Army's ability to learn from the past and close adaptive cycles through feedback mechanisms.

b. **Role and value of individuals in the future Army** *(Theme 28).* One significant finding relates to the way the Army sees its employees and their role in building a highly adaptive organisation of the future. This correlates with a complex adaptive system approach that recognises the importance and contribution of system's elements in building system behaviour. Below we demonstrate the Army's vision of the role of individuals in the future Army.

First, it is commonly acknowledged that the strength of the Army is in its people. It is further recognised that modern warfare conditions are dynamic and unpredictable. Consequently, it is a non-trivial task to develop a highly effective Army (including its structure, roles and responsibilities, and processes) that will adroitly support changing external requirements, both

from the government and operations. Moreover, there are a number of constraints of the Army's work: long-standing traditions, history, morals and ethics, interventional laws and etc. The Army leaders see it as important to realise and utilise the intellectual potential of its employees and build the organisation around them to encourage their adaptation to new challenges through innovation. The Army's employees are seen as the greatest strength of the organisation as their attitude and adaptability are believed to be the factors that determine the level of organisational adaptability in the future.

> *"if you don't utilise the whole talent that you've got then you're not a smarter organisation as you might be and if we're going to remain a small army then you've got to tap the talent of everybody to be a big army because you're greatness comes from the intellectual ability of your people not from how big you are physically" LTGEN Ken Gillespie (Ret.)*

> *"What we are trying to build in the future is not based on equipment or physical things it is based on attitudinal things. The most powerful thing we can build and we are designing into the force for the future is built around an individual who is able to innovate and adapt to whatever the challenges are. I can give them different equipment every year and if I prepared them the right way, then they will quickly train to that equipment and adapt to the circumstances. Whereas if I build a beautiful force and they are confronted with something that they are attitudinally not prepared for, then all of that beautiful equipment will be irrelevant. And there are many historic and contemporary examples where better equipment and larger Forces in our own army have performed very poorly because the one thing they didn't focus on is the cognitive components of the Force" Interviewee E*

Second, the Army's 'vision' for how to improve its approach to personnel development is leveraged from the approach that is employed within the Special Forces. While characteristics of Special Forces are broad, the AAI interview suggested a general vision of the future soldier that is similar to some extent to Special Forces. The main idea is linked to the self-

comprehension the future soldiers should build, i.e. they are supposed to see themselves as an integral part of a bigger system, the Army and its various parts, to which they continuously add value and ensure their ability to participate in different tasks within different teams. To make it possible, future soldiers should share principles of continuous self-education and self-development. Education is seen as the key to achieve a high level of overall organisational adaptability; thus, education processes and programs, provided by the Army, should train and develop its employees in such a way that they can adapt to any operational conditions on the battlefield. An interesting comment was made on the role that uncertainty plays in the training model – it is believed that a level of uncertainty incorporated into training would more broadly challenge soldiers leading to greater opportunities to learn from gaps in their capabilities – that is the idea that *imperfections drive adaptability*.

> *"We are taking them [soldiers] away from the traditional paternalistic military where soldiers wear what they are told to wear, say what they are told to do, follow orders and do those things, into one where the solider is almost taking on a quasie-special operations persona, where they are self-educating, self-developing, they are seeing themselves as a system and they are value adding on a continuous basis in terms of their relevance and their ability to participate in different teams, that concept is not achievable within the current army now" Interviewee E*

> *"those imperfections [in the training system] are driving my organisation continuous adaptivity as those cope with those deficiencies as part of learning how we cope" Interviewee E*

Third, the discussion of a human resource approach covers the correspondence between types of personalities and positions. During the AAI interviews it was shown that different types of task (short-term and long-term) require different types of personalities to deal with them. Thus,

allocation of people for positions should take into account their personality type and job requirements since a proper match can reinforce employee's strengths for particular roles and lead to greater organisational effectiveness in general. The current mechanism of matching personality types and position requirements is not particularly strong. There is an extensive literature on this topic, which is not reviewed here. The third point simply arises as a general observation in conversation with the very different characters interviewed for the research.

> *"Some people are really good in emergencies. They have got a quick mind. They could weigh up a crisis really quickly and then they can pump out some direction and guidance that is a really, given the time available, a really good solution to a crisis that we face. There are other people whose brains just do not work that way and they are not good in a crisis. They do not solve issues well quickly, but give them a problem, a vision or thinking about something into the future and something that does not require immediate resolution but requires analysis and thinking about the future and all of that. There are people whose brains are wired really well that way, so I guess I have always been a temporal guy. And what we found in Army Headquarters with all of the problems we faced in all the temporal spaces was that the staff were just a mis-mash, mashing to whatever job they were posted into. if I had my way for me Nirvana would have been that ultimately you would have Army Headquarters placed in those sort of temporal settings, but you would also actually use techniques, the psychs or whatever, you would produce techniques or do self-assessment that people being posted into the Headquarters that are really suited to the here and now crisis going to that part of the Headquarters and those that are really suited to the long term thinking and analysis go into that part of the thing and that is the way organisations would perform really well" MAJGEN Paul Symon (Ret.)*

c. **Developing organisational adaptability in the Army** *(Theme 29).* We were interested in areas that the interviewees saw as important to pay

attention to in order to improve adaptability in the Army. Along with the aspects mentioned above (strategic lessons and role of individuals) a number of areas were highlighted: acceptance and understanding of the complexity of the modern environment, leadership and organisational culture, and organisational structure. The themes are explained further below.

> Given the complexity of the strategic environment… the security of the United States demands military leaders intellectually prepared to adapt to unexpected challenges" (Murray, Williamson 2011b, pp. 40-41)

First, it was commonly discussed that it is still necessary to increase a *wider awareness, acknowledgement and acceptance of the complexity, dynamism and unpredictability* of the modern operational environment. This indicates a clear shift in thinking from an expression of a linear business/military/economic/technological environment to a complex, dynamic and unpredictable environment; this demonstrates the need for organisational change to ensure the Army is able to effectively deal with that change.

Second, leadership and organisational culture are seen as important areas for organisational adaptability. In regard to leadership, it was suggested that future leaders should be carefully selected among personnel who demonstrate leadership qualities (this correlates with the idea of a better fit between personality types and positions). Moreover, the development of leadership skills of future leaders should start now to make them available later. Going further, the need for diversified knowledge and experience of future leaders was strongly advocated. This includes understanding of other military services (Air Force and Navy) as well as work principles of business environment (incl. real-life practical experience in organisations external to

the Army). It is also suggested that attention should be paid to organisational culture and concepts such as the *Australian Soldier*[43] that should be employed to engender soldiers' aspiration and motivation necessary to achieve high standards and excellence. Finally, it is believed that current and future change initiatives should be implemented with strong leadership commitment and support.

> *"I think we have got to be a bit more hard nosed about those that we let go through the system and certainly by the time I had left we had built a knowledge of who we saw as our future leaders from about Senior Lieutenant Colonel onward and we started to build gateways through which we wanted them to pass and be tested to see whether or not they were capable of leading the Army strategically or tactically… I think that senior service Officers and senior public servants along the way ought to spend two or three years out in a really demanding commercial environment. Work it out with industry, create a position, let them see some of the pressures that happen outside the bureaucracy. The net effect is that once you rise to the top of the organisation your decision making process will be a whole lot better than it is currently. So what you have got is a massive change of environment in the commercial enterprise and almost no change of environment in the bureaucratic enterprise and that cannot work. So yeah, I think they are prepared but not just to swim, I think there has got to be development, there has got to be challenges along the way and even whilst they are in the jobs there has got to be some review of their processes of how they stay adaptive" LTGEN Ken Gillespie (Ret.)*

[43] "Established by Lieutenant General Peter Leahy in 2006, the 'I'm an Australian Soldier' campaign aims to cover the so called 'soft' side of the Hardened and Networked Army. The initiative is built on nine core behaviours, which describe a soldier ready to meet any challenges on operations. The nine core behaviours are aspirational in nature. The challenge is to ensure that each move we make takes us towards a common goal: developing our soldiers for the challenges of the future" (*I'm an Australian Soldier* 2014).

Finally, the interviewees suggested that the classical hierarchical organisational structure of the current Army may not represent the best option for dynamic and unpredictable operational and global environments. It was suggested that the Army should consider a move from a hierarchical structure and C2 system to an arrangement that allows better interconnectivity between organisational elements. This new, partially decentralised approach to management would support a more equally distributed decision-making mechanism throughout the organisation. Moreover, such delegation of decision-making could improve organisational awareness as more elements and individuals would be engaged in the direct conduct of capability outputs and therefore more in touch with the external environment. The idea has a strong correlation with the principles of Network Centric Warfare, where geographically dispersed forces develop a network in order to improve information sharing and increase mutual awareness leading to self-synchronisation to achieve common mission goals. This new view of organisational structure provides an example of an attempt to move the Army's adaptive processes to level 3 of adaptation by questioning the effectiveness of the existing processes. From a theoretical perspective, this approach correlates with the principles of CAS that talk about the importance of interconnected elements which act independently but contribute to the overall system's success. If the Army does seek to transform its structure and processes and create a mentality to rebuild itself, then an approach informed by CAS theory could support a flexible way to change management.

> *"So into the future I believe we need to move from the current hierarchical system which has been with us since World War 2, World War 1, into an arrangement with the interconnectivity which is allowed through digitisation, allows for matrix decisions to be made in distributed nodes, with a completely different outlook to delegated authorities, it's a self-forming*

and adaptive arrangement. So that the threats and challenges on a modern battlefield, means that we're no longer dependent on single decision making nodes, set within a hierarchy, forcing linear processes through human beings that aren't moving fast enough to anticipate the challenges on the modern battlefield. Now that's the big challenge in the Army, not structuring a new Brigade or introducing your equipment, is how do I migrate the decision making cultures within an ADF that maybe I don't have control of from the linear hierarchical mechanism and interpretation of mission command" Interviewee E

d. **Maintaining organisational adaptability in changing operational environments or a possible transition to low operational tempo** (*Theme 30).* The period of the AAI interviews was marked by the Australian Army's withdrawal from Afghanistan after 12 years of operations. This led to a suggestion that the Army could be entering a period of low operational tempo or facing significant changes in operational conditions. Such a period could include a few, or no, ongoing operations and could present the Army with a situation where it could not practice and test its capabilities in an operational environment. The second point is about lessons the Army can extract and transfer from Afghanistan to other operational environments (e.g., Iraq or Syria); this would require an ability to assess which changes should be maintained and which were environment-specific to Afghanistan and no longer relevant.

Thus, we were interested in how the Army should maintain its '*fit for purpose*' in these circumstances and ensure that its capabilities would be appropriate for the next potential war scenario that might significantly differ from current operations. Talking in more general terms, we asked: *how should the Army maintain its organisational adaptability if conditions transition into a low operational tempo or a significantly different operational environment?* Points below summarise our findings.

First, the main findings relate to the fact that the war is the strongest driver for change; it provides the environment and unavoidable impetus to test, practice and improve capabilities needed to be successful and avoid casualties in war. This means that it is hard (if not impossible) in practical reality to create simulated operational conditions that will completely substitute for actual war. From a theoretical perspective, this links the Army with the CAS principles. In particular, CAS heavily relies on feedback from the environment to evaluate a system's success. For the Army the real-life environment is war, which provides feedback on how well the organisation is prepared for operations, as well as appraising its general level of organisational adaptability.

Thus, in a case of low operational tempo, it is necessary to keep developing capabilities and maintaining organisational adaptability. For the Army this means that it is necessary to continuously review and study contemporary operations around the globe to extract lessons from them. The analysis of information from contemporary operations leads to the development of the most dangerous scenarios for the Army to train and test its capabilities and adaptability in a range of simulated environments. However, preparing forces for possible operational conditions should include an understanding of the risks for the Army of optimising for a specific environment.

> "The larger issues for military institutions has to do with how well they innovate in peacetime and adapt in war to the actual conditions of combat... As Michael Howard has suggested, war is not only the most physically demanding of the professions, it is also the most intellectually demanding. There is a direct correlation between those military organizations that innovate intellectually in peacetime and those that adapt to the actual conditions of war effectively" (Murray, Williamson 2011b, p. 22)

> *"You keep with your cycles [force generation cycle of force training and preparation for a particular scenario of war], you assign force with all the ready elements to the commander of the deployable joint force headquarters, and you give him sufficient resources to understand operations wherever they are in the globe, developments that are occurring, undertake lesson studies. You know if Israel is back into Gaza and all of that, then you spend some money and you study those contemporary examples in great detail and come back and workshop it and think about you know what are the lessons that are derived from that. You know that part of Army should always be on the edge of their seat watching developments around the globe and working it really hard and building that short learning loop mindset into everything they do… And there are going to be pockets of clashes around the globe on a constant basis and my view would be there is always a lesson to be drawn, but you just need to set up the architectures and provide the resourcing to let them do it" MAJGEN Paul Symon (Ret.)*

Secondly, the interviewees also mentioned that low operational tempo can create another obstacle for the Army to maintain its organisational adaptability. In the case of a few or no ongoing operations, it is possible that priorities of the government, the ADF and the Army itself can switch from the need to develop a truly adaptive organisation to other issues. This can lead to insufficient leadership support (incl. resources) to develop necessary capabilities and train them in a simulated environment. Therefore, it was suggested that there should be strong leadership support and commitment to continue developing a high level of organisational adaptability even in a case of low operational tempo.

Finally, a number of interviewees suggested that the Army should encourage increased bottom-up adaptation. The importance of innovation was highlighted as an approach that prepares the Army for future contingencies: *"innovation happens between wars, adaptation is what happens in the war"* (Interviewee B). A particular emphasis in the interviews was made on the

need to educate personnel during peace-time in order to develop the soldiers' ability to innovate. In other words, while innovation is seen as a positive action aimed at improving the organisation during peace-time, it is further linked to the ability of units to apply the same principles on the battlefield to adapt to unforeseen circumstances. This finding correlates with the way the Army perceives role of its personnel in achieving organisational effectiveness and success.

> *"The first thing you have got to do is you have got accept that you cannot replicate war in training. You know I really like a lot of the work that is why Murray and those kind of guys are so important here, because they actually delineate between innovation and adaptation. And innovation in their approach is what happens between wars and adaptation is what happens when you get to the war and you find you have screwed it up. So in peacetime you are really talking about how do you foster innovation to inculcate a culture at all levels, not only ensuring you are optimally prepared for the next fight, across a range of different skills and ideas and mindsets and stuff, but placing you well, or posturing you so that when you get to the next fight and you discover where you have not quite prepared for this, you can adapt better and more quickly than the other guy. And that is how I use this term, win the adaptation battle. Peacetime training and education needs to focus on building people who can win that adaptation battle during conflict. And I have got to tell you, a huge part of that is education, not training. It is having people with the minds that have a broad understanding of military history, that understand there is actually nothing new that we will face in future, just variations. Cyber warfare is not new – it is just a variation in communicating because there are still humans who are making decisions about it, so you know, military education is one of the biggest returns of investment for dollar spent if you are going to build that foundation for adaptive people in warfare" Interviewee B*

4.3.5. Adaptability of the Army *(Theme 26)*

The analysis of the interviews informs aspects of the Army's adaptability in general by highlighting both positive and negative points. Below we provide a summary of our findings (Figure 33). We do not claim that they represent an overall assessment of organisational adaptability, but rather indicate areas that impact on the success of organisational adaptation.

Figure 33. Organisational adaptability in the Army

a. **Organisational adaptability at various *organisational scales*, i.e. individual, team and organisational.** Initially, our interest was in a general appraisal of the adaptability on various organisational scales: individual, team and organisational. As the study's scope did not include a detailed examination of the processes at the various organisational scales, we simply asked interviewees to evaluate the Army's adaptability at different scales.

Adaptability at a *tactical level* covers both individuals and teams. The Army's adaptability is seen to be high at this scale. Both East Timor, Afghanistan and

Iraq represent cases where the Army faced operational conditions that significantly differed from conventional ways of fighting: unlike face-to-face conflict with the emphasis on power superiority, these operations were dynamic, asymmetric and unpredictable. It was further stated that tactical adaptation is only possible because of people on the battlefield who had proper skills, experience, knowledge and attitude that draw the way they adapted.

What has emerged from the interviews is that adaptation on an *organisational scale* is not as effective as on an individual/team scale. However, it was claimed that adaptation on an organisational scale requires a significant time period before results are revealed. Moreover, the pace of organisational scale adaptation was suggested to be dictated by the fact that the Army has to deal with higher-level requirements (e.g., government, technological change). These requirements are bigger and more complex than those at a tactical level.

b. **Bureaucratic processes.** Interviewees classified bureaucratic processes as factors that impact on organisational adaptability. It was mentioned that bureaucracy constrains the implementation of any adaptive actions making organisational adaptation more difficult, frustrating and slow. As a result of the AAI, the organisational structure of the Army was changed, leading to the simplification of bureaucratic processes. However, the issue of the significant bureaucratic overload still remains relevant and is seen as one of a significant forces that limits organisational adaptability.

c. **Diversity of knowledge and experience.** The third factor was the diversity of knowledge and experience that helps to reinforce organisational adaptability. An example is the posting cycle that rotates soldiers and officers across different positions in the Army every 2-3 years (or 4-6 years for a double posting). This involves personnel moving from one job and/or

location to another within the Army in order to fill a vacancy and to expand personnel experience, knowledge and skills[44]. Such an approach allows the Army to transfer knowledge and experience from one part to another, and provides cross-functional bottom-up innovation and adaptive learning. This in turn helps to improve organisational adaptability by providing an opportunity to share knowledge across the whole organisation. However, the posting cycle has its own drawbacks that are not discussed here.

d. Knowledge sharing and the utilisations of lessons. Habits of knowledge sharing and the utilisations of existing lessons were mentioned as those that impact on organisational adaptability. Organisational culture, especially in relation to the way the Army shares knowledge and uses lessons, was mentioned as a negative factor. It was suggested that there is no organisational habit to use existing lessons when a proposed change is being developed; that leads to the Army usually re-learning lessons instead of applying existing ones. It is also mentioned that there is cultural resistance to information sharing; in other words, the Army has a very protective culture towards information. On the other hand, informal networks are believed to be very strong and they support information sharing far more effectively than formal networks, leading to important informal adaptive cycles. Although, the majority of these cycles are not documented, their existence demonstrates inbuilt adaptive mechanisms organic to the Army's functions.

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[44] "A posting order authorises a Service member to move from one job to another in the Service and from one location to another, either to fill a vacancy or to broaden the member's experience and professional development. The general factors considered when posting individuals are: the need of the relevant Service to maintain capability; the career and development needs of the individual; and the individual's job and geographic location preferences. Not all personnel can be posted to all positions of their rank. Many positions require specialist knowledge, particular experience or specific training.. allows the Army to transfer knowledge and experience from one part of the Army to another. This in turn helps to improve organisational adaptability by providing an opportunity to share knowledge across whole organisation. However, posting cycle has its own weak points" (*Causes and Consequences of Personnel Postings in the Australian Defence Force: Department of Defence* 2001).

e. **A comparison with other Western armies.** Finally, we asked interviewees to compare the organisational adaptability of the Australian Army with that of other Western armies. There was a general agreement that the Australian Army is more adaptive than other Western armies. First, because the Australian Army is a small army. This means that as a smaller organisation, it is easier for it to change as it has less inertia and a simpler bureaucratic structure that allows for faster communications. Then, a further attribute of the Australian Army is linked to the selection of personnel with a strong match with *action-orientation*. It was claimed that the Army is more "*ready to jump in and figure out how to do things*"[45] than some other armies. We acknowledge that this could be a biased claim; however, we aimed to capture how the Army perceives itself.

4.4. Processes of organisational learning (ALN case study)[46]

In this section we review the processes that are designed to support organisational adaptability. The ALN case study represents a particular interest as it also shows one of the AAI goals; thus, its analysis informs an understanding of how the AAI was implemented and what it achieved. Undoubtedly, it is hard to generalise the success or failure of the AAI based on the review of only one AAI goal. However, due to constraints (access to the organisation and time) we conducted one detailed case study in order to appraise how the Army learns from its experience. Here we simply report the findings of the ALN review. This case study was conducted during 2013 and the findings relate to the ALN as it was at that time. It should be noted that a number of changes have been implemented since then.

[45] From the interview with Dr Anne-Marie Grisogono.

[46] Note: a proportion of what follows is contained in earlier writings, which I co-authored with Dr Matthew Richmond of DST Group (2016).

4.4.1. Process Models and Initial Gap Analysis

In order to analyse the effectiveness of the ALN, initially a systems model of each learning mechanism (the *as-is* and the *designed* views[47]) was developed based on available documentation; including the business processes, products and information flows between the relevant parts of the network. The *designed view* and *as-is view* were compared to each other to identify any gaps or implementation weaknesses, and also any gaps when compared with the learning processes of the theoretical model were highlighted (Appendix C. Designed and as-is view of the learning processes in the Australian Army). The gaps are summarised below:

- Lack of formal, structured, consistent processes across the whole[48] of the ALN, including for:
  - monitoring of decisions during implementation such as defining expectations and setting goals to support feedback to decision-makers and decisions on any refinement required;
  - developing options for decision-makers;
  - prioritisation to focus data collection; and
  - analysis methods.
- Stove-pipes between lessons loops including a lack of coordination, and fragile processes that support information flows, across them.
- Services that are available are not always well integrated into the broader Army; e.g. quick look report production, ALIAS database as a knowledge repository to support Army strategic planning etc.

[47] The *as-is view*: i.e. how the ALN functions in reality, including both formal and informal processes. The *designed* and as-is views were compared to each other, as well as to a theoretical model of organisational adaptability, and implementation weaknesses/institutionalisation in the existing processes identified as a result. This analysis was used as the basis for the next step.

[48] Note that some parts of the ALN had and have well-developed, established processes, particularly for the short leaning loop (AWB). Furthermore, many of the issues highlighted here have been addressed by changes implemented since the review was conducted in 2013.

- From available documentation, lessons from individual training and sub-unit collective training did not appear to be formally incorporated into business processes.

4.4.2. Stakeholder Input

The next step of the analysis focused on obtaining Army staff inputs (from CAL, G7 and HQ 1DIV) on learning processes, where gaps highlighted in the first step were used to initiate discussion. Two SWOT workshops with CAL were conducted in August 2013. The first workshop identified 5 strengths, 8 weaknesses, 9 opportunities, and 5 threats. The second workshop with G7 identified 5 strengths, 10 weaknesses, 8 opportunities, and 7 threats. The last input (HQ 1DIV) was provided by the third interested party and resulted in 7 strengths, 2 weaknesses, 5 opportunities, and 0 threats. Refer to 'Appendix D. Results of SWOT workshops' for more details. We are not discussing SWOT workshop results in details as they represent a step in the process of gaining the final ALN review outcomes.

The analysis of the SWOT data informed the final step of the stakeholders input – TOWS analysis. While details of every TOWS are provided in 'Appendix E. TOWS results', below we give a general description of the results. The goal of the TOWS analysis was to identify strategic drives needed to improve the system's function as well as actions that could be undertaken to achieve that. The first and second TOWS analysis resulted in 6 and 2 strategic drivers that covered 24 and 6 actions that can be undertaken to achieve new (desirable) system states respectively.

4.4.3. Evidence in support of issues: historical data analysis

During the review, the CAL provided information regarding the number of lessons and insights that have been identified over the lifespan of the Army

lessons database (now called ALIAS).[49] Analysis at both the insights and lessons levels was conducted. At the lessons level there were about 55 unique lessons on ALIAS of which 12 (or 22%) were classified to be concerned with Force Preparation/Short Learning Loop, 35 (or 64%) with Force Generation/Medium Learning Loop and 8 (or 15%) with Force Modernisation/Long Learning Loop. At the insights level, 100 insights were randomly selected from the total of 890 insights in the ALIAS database to provide a reasonable sample. These data were classified, by two DST Group staff members independently, against 5 criteria; (i) data source that initiated the insight, (ii) the lessons loop where the insight would most likely lead to an action being implemented, (iii) Fundamental Inputs to Capability (FIC)[50], (iv) classes of adaptation and (v) levels of adaptation. This analysis was used to corroborate issues and to support development of actions. Care must be taken not to over interpret these results as, firstly, they are not assessing the impact of the implementation of the lessons only a count (i.e. 10 minor insights may have less impact than 1 major insight) and, secondly, it is unclear what the distribution of issues should be for a highly adaptive organisation given the environment. Nonetheless, this data analysis does give an indication of the areas that have been the focus for the lessons network. The distribution of results is presented below (Figures 34-39). This analysis also represents an attempt to apply the CFA (in particular to appraise what classes and at what levels adaptive processes are working).

[49] Note that ALIAS has three levels; Observations, Insights and Lessons. Observations can be entered by any member of the ADF, whereas Insights are aggregations of observations that have occurred multiple times and will have significant consequence if not addressed, and Lessons are the highest level where actions have been implemented to remedy the issue.

[50] "Achieving a capability requires more than purchasing equipment. A capability is provided by one or more systems, and is made up of the combined effect of multiple inputs. The inputs are known as the Fundamental Inputs to Capability (FIC)" that are: personnel; organisation; collective training; major systems; supplies; facilities and training areas; and support (*Defence Capability Development Handbook* 2012).

General observations from the results indicate that: (i) there are very few strategic lessons (for example, the Command & Management and Organisation FICs each make up less than 10% of the insights), (ii) few lessons are sourced from outside of operations or major exercises (i.e. few lessons from individual training or from sources external to the Army), (iii) few insights relate to resilience (i.e. the ability to maintain core functions), and (iv) levels of adaptation primarily relate to levels 1 and 2 (i.e. actions in the world and the mechanisms to improve them).

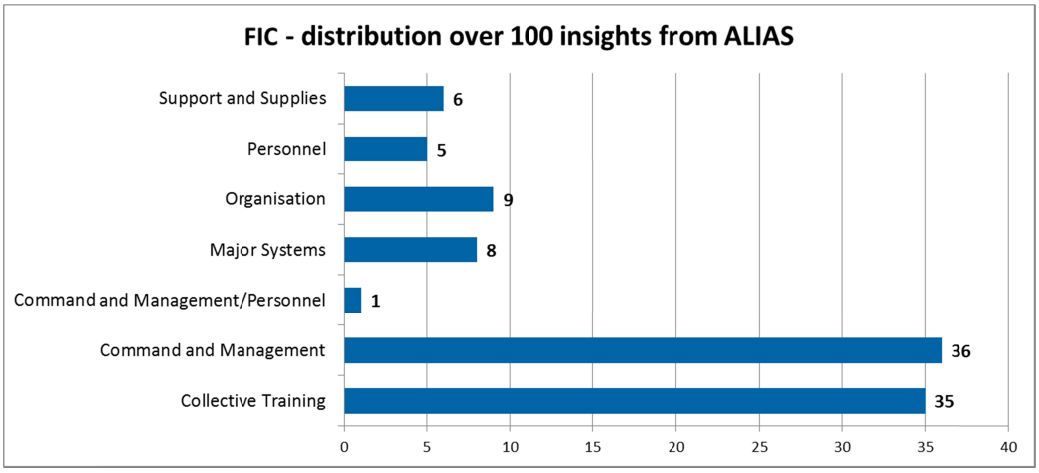

Figure 34. Distribution of Lessons data by FIC

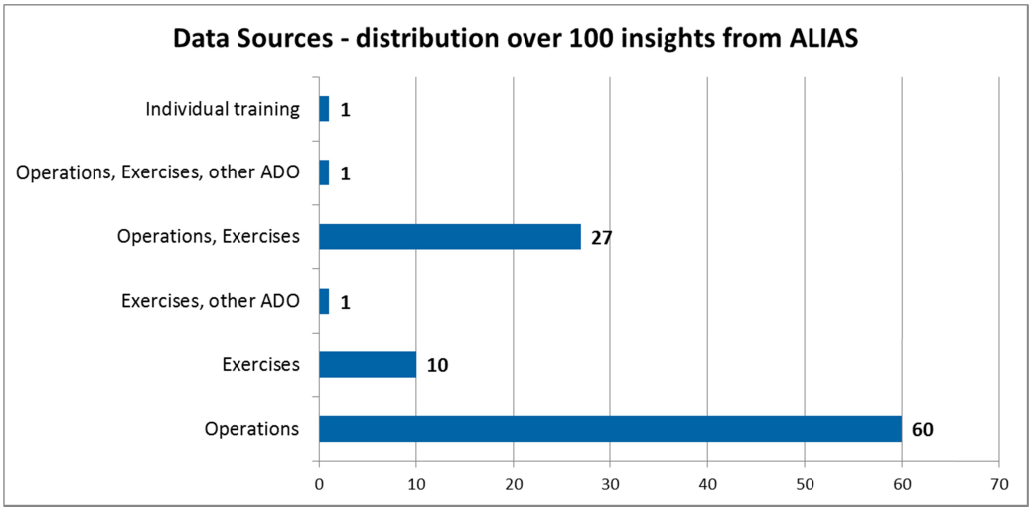

Figure 35. Distribution of Lessons data by Data Source

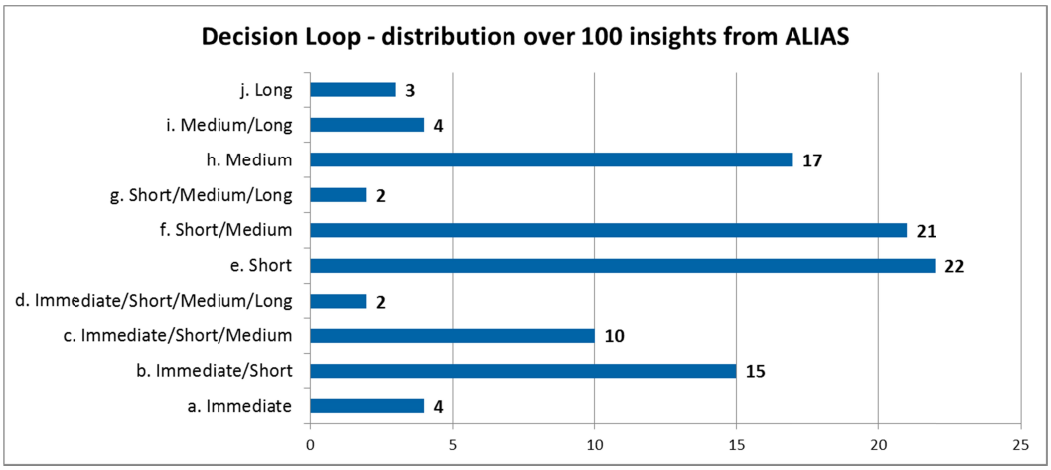

Figure 36. Distribution of Lessons data by Decision Loop

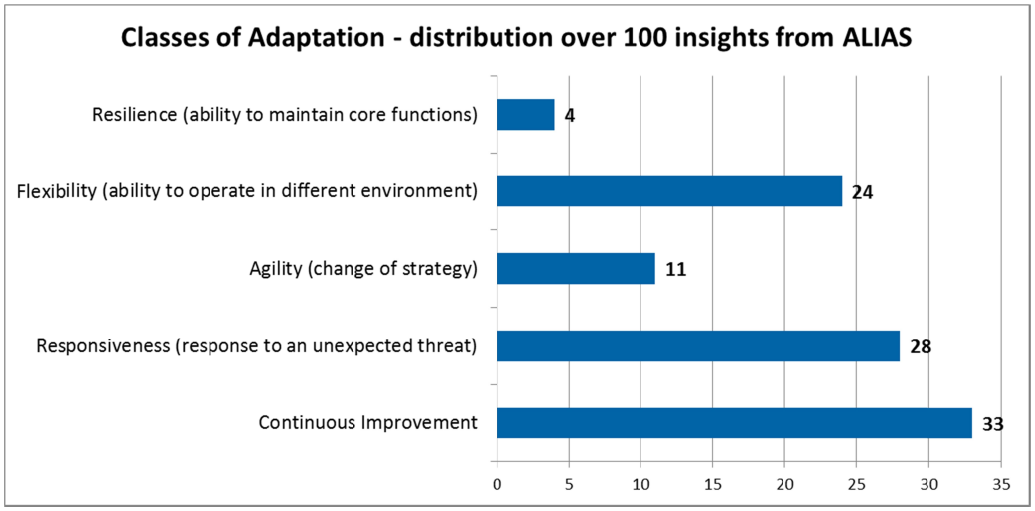

Figure 37. Distribution of Lessons data by Classes of Adaptation

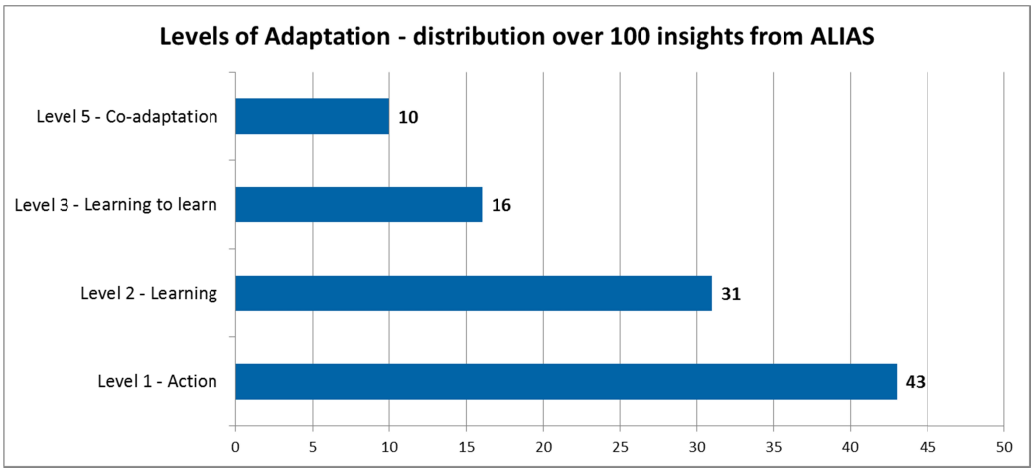

Figure 38. Distribution of Lessons data by Levels of Adaptation

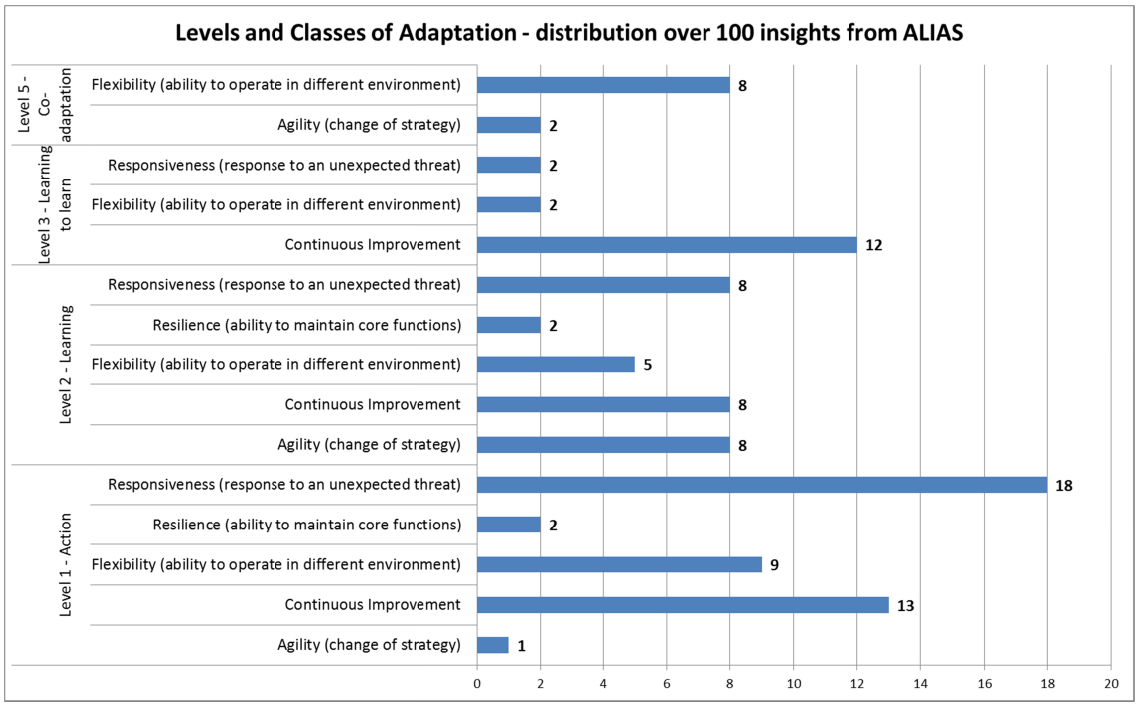

Figure 39. Distribution of Lessons data by Levels and Classes of Adaptation

4.4.4. Evidence in support of issues: cultural perspective

The ALO team input represents a comprehensive description of the cultural issues of organisational learning processes identified during a 10 year study. This informed our understanding of the socio-cultural aspects of the ALN. Without highlighting technical issues identified by the ALO team, below we provide the main cultural areas that are worth mentioning:

- The importance of generating a culture of lessons sharing instead of lessons collection. Moreover, the culture of knowledge sharing should naturally be embedded in the organisation rather than driven by formal processes.
- The importance of shifting the perception that states that knowledge is power to a culture that supports ease and open information dissemination.

- The importance of developing an open culture that acknowledges the value of, or acceptance of mistakes, providing an opportunity to learn from them as well as critically evaluate success cases.
- The Army's culture of being 'action-driven' a culture that wants to fix issues here and now can have a potentially negative impact on long-term planning and makes tactical, operational lessons (e.g., casualties) more of a focus as they allow for a fast and tangible solution.
- The strong role of leadership on the prioritisation of lessons and the determination of directions for change.
- The strong role of informal social networking that is faster and more reliable and effective in obtaining the necessary information.

4.4.5. Synthesis of the ALN analysis

A general synthesis of data from the TOWS analysis, cultural perspective and analysis of evidence from the lessons database has resulted in the development of a list of issues.

The major issues highlighted during this review of the ALN can be characterised into four main categories: (i) ALN structures and processes, (ii) cultural issues, (iii) technical issues and (iv) Joint & Strategic issues. Below the main issues are listed for each category including evidence gathered that led to them being highlighted (Table 5).

Table 5. Identified ALN issues

Issues related to the ALN Structures and Processes

1. Lack of integration of the ALN into the wider Army and relatively poor knowledge of its capabilities, and training on them, leading to inefficient use of the ALN resources; opportunities exist to better exploit lessons and to better focus ALN capabilities on priority areas for data collection and analysis.
2. Poor coordination of lessons collection which are not well aligned with organisational priorities leading to possible duplication of effort, lost opportunities for cross-synergies, and poor dissemination of information between lessons domains. Management of the lessons network has been delegated to a rank level that does not have the appropriate authority leading to difficulties in resourcing and integration.
3. Roles, responsibilities and structures are generally not well understood, including who has the authority to implement lessons and coordinate them across the ALN. Lessons loops have been developed in an ad hoc fashion leading to complex processes, poor integration and to possible delays or oversight of improvement opportunities. Cumbersome procedures and chain of command issues that require significant staff effort to navigate to achieve lessons implementation.
4. Expected benefits of lessons are generally not articulated nor monitored possibly leading to a lack of recognition that results were not achieved as anticipated and a lost opportunity for continuous improvement.
5. Absence of clear strategic guidance on lessons priorities both in terms of domain areas to focus and on the level of lessons desired (tactical, operational, and strategic). Furthermore, centralisation of lessons staff under DGT could lead to an ALN focus on FORGEN at the expense of strategic lessons leading to a reduction in ALN support to the longer lessons loop.
6. There are parts of the Army that have developed lessons systems that are not integrated with the ALN leading to complex, unsynchronised lessons processes.

Joint and Strategic Issue

7. The Army has a more mature lessons network and related processes than other groups within the ADO. The ANAO recommendation to move to a fully integrated Joint lessons system provides both an opportunity and a threat to Army's current capabilities; including the current ALIAS capability that may be reduced or even lost.
8. SOCOMD appears to be not well integrated into the ALN.

Cultural Issues

9. There does not appear to be an organisational habit to automatically feed input into and utilise ALN data leading to a system that is not fully optimised to record and make use of organisational knowledge.
10. Lessons are mostly bottom-up and at the tactical level; there is a lack of strategic direction and focus on posturing for the game-changing threats and opportunities. Furthermore, very few are sourced from areas other than Operations or Exercises (approx. 3%), e.g. from technology reviews, other militaries, academia/intellectual analysis, individual training etc., and very few relate to implementation in the long lessons loop.

Technical Issues

11. Lack of staff resources to analyse all lessons data, to conduct trend analysis and target lessons distribution; leading to the need to examine large amounts of information to locate transferrable lessons.
12. Not all lessons data is available to ALN staff leading to incomplete analysis of Army lessons.
13. Not everyone has access to Information systems on the DRN (e.g. ALIAS) and SharePoint has restrictive access privileges and there is not a structured, defined process for information control and management; leading to opportunities to more effectively update and utilise lessons data.
14. The Army has a more mature lessons network and related processes than other groups within the ADO. The ANAO recommendation to move to a fully integrated Joint lessons system provides both an opportunity and a threat to Army's current capabilities; including the current ALIAS capability that may be reduced or even lost.

4.4.6. Summary of the ALN review

This case study presents a review of the ALN, and has resulted in a number of significant outcomes, the most fundamental of which is that units and individuals within the Army who collect, analyse or disseminate lessons have systematically reviewed and assessed their contribution to the ALN and how the ALN contributes to the Army becoming more adaptive at an organisational scale. The issues identified detailed some significant limitations within the ALN, especially the siloed effect of aligning learning loops with Army's command structure, a lack of a centralised coordinating authority, poor alignment with Army's organisational goals, and a lack of a formal approach to monitoring and feedback during lessons implementation for some parts of the network. Since the review was conducted the Army Lessons Policy has been updated, which was formally released in March 2015.

However, in general the ALN review allowed us to study learning processes employed within the Army. The review demonstrated that learning processes represent a strong mechanism for change that covers four temporal domains – individual, tactical, operational and strategic. Each domain is linked to the others allowing lessons to flow across the whole organisation. While the main goal of the ALN review was to identify areas for improvement, it was confirmed that the ALN is a strong mechanism for information exchange particularly within the tactical domain ensuring deployed units are efficiently prepare for ongoing operations. The ALN represents a formal structure that was designed to support lessons dissemination and through its review another side of the lessons processes was demonstrated, namely informal communication that occurs in the Army. Informal information flows play a significant role in how soldiers and officers share what they know in order to increase their success both in

operations and everyday work (mastering their capabilities, managing ongoing processes and conduct long-term planning). Through the ALN we highlighted the importance of informal information exchange and indicated that its strong points should be incorporated into the formal lessons structure. Moreover, the ALN review allowed us to apply the CFA model of organisational change and demonstrated its limitations including that the *designed*, and *as-is* views are too rigid as they sometimes lack the ability to properly illustrate lessons processes. We also applied other parts of the CFA (i.e. classes and levels of adaptation) in order to learn about our approach, we found that both classes and levels of adaptation represent abstract concepts which are difficult to translate to actual systems. Nonetheless, we obtained valuable experience through the ALN review which gave us an opportunity to apply the CFA model and get users' feedback for its further refinement.

Notwithstanding the fact that there is always room for improvement (as the ALN review identified), the ALN is a case of ideas of organisational learning that have been implemented in the Army and are seen as a mechanism for continuous change. Moreover, the ALN review showed Army's interest in integrating and synchronizing its lessons processes with the wider ADF and in turn indicates the Army's recognition of its participation within a bigger complex adaptive system.

4.5. Synthesis of data analysis

A number of major observations arise from applying the Complex Adaptive System (CAS) theory to the way the Army approaches its own self-generated need to consider future adaptability. Thus, to synthesise the research findings we utilise the main principles of CAS and discuss the case of organisational change in relation to them. As was explained earlier (Chapter

2, p. 83) CAS have a number of key properties that can be used to support the analysis of the nature of complexity in a system such as the Australian Army. We use these properties to discuss how close the Army is to the ideas of CAS. The analysis is informed by the AAI interviews and the ALN case study.

A lesson from applying the ideas of CAS to the Army is that organisational life appears full of ambiguities and contradictions. The spirit and form of both the AAI and ALN is to bring these opposite forces into some kind of rational management. In a nutshell, this is where complex system management makes its entrance with the Army as an ideal-type illustration.

- ***Agents and their interdependence, diversity, rule-based behaviour and aggregation.*** *CAS consists of a number of agents, each agent has its own rules of behaviour. All agents are interconnected; there are different types of agents and interconnections among them. Agents can be aggregated into 'meta-agents' that act as a single entity at a higher level.*

First, the Army is a complex system that consists of several parts (headquarters) that work on their own functions with their own independent goals but contribute to the overall organisation's effectiveness. Moreover, as was acknowledged several times, Army's potential is its people who personally and as team members contribute enormously to the system's success. From this perspective, the Army is a complex system that consists of a great number of interconnected agents (people) that are aggregated into bigger entities such as teams, units and headquarters. All agents, both headquarters and people, relate themselves to the system (Army), both by accepting its rules of behaviours and bringing their own agenda to the table. An obvious example of interconnected agents with their own rules of behaviour is seen when the Army participates in war. Complex operational environment, no matter if it is conventional or modern warfare, naturally pushes military forces to a state where their soldiers must be both

independent and dependent on each other. More than a strategy for survival and victory – such semi-independence or interdependence allows them to modify their actions in order to achieve their mission success. Network Centric Warfare (discussed in Chapter 2) is an example of the close collaboration of different military services (national and international).

There is another way to view the Army – as an agent within a bigger complex adaptive system that is the ADF. From this perspective, the Army represents an entity of the system that dictates rules of the game but requires its players to be active (if not proactive) and adapt in accordance to general guidance. In such situations the Army needs to constantly monitor higher level requirements and align itself with other agents such as the Air Force and Navy, and with other defence organisations as well as non-military organisations that actively support and influence modern military engagements. In addition the ADF is subject to political and legislative control through a democratically elected parliament and the laws of the land. It cannot act as an independent system without destroying the foundation of democratic society.

Thus, in its desire to be an effective system both internally and externally the Army is concerned with the way it involves its internal capabilities though the continuous development of its structure and processes; these also include strategic planning, joint alignment, leadership and human resource development generally with special attention given to education. It is recognised that great emphasis should be placed on personnel education as a way to ensure future organisational success especially to foster independent critical thinking. Thus, despite the fact that military organisations are still perceived as closed and rigid, they strongly acknowledge themselves to be social systems whose effectiveness heavily relies on their people. Weapon, device or technology can provide significant benefit if there is no one who

can properly and wisely use it. It is also acknowledges that it is necessary to develop interactions with other organisations outside the Army.

- ***Nonlinearity.*** *CAS is inherently nonlinear, i.e. interconnections among agents are not linear. Nonlinearity and interdependence of CAS agents make the reductionist rule of representing the whole as a sum of its parts inapplicable. Thus, there are no clear cause-and-effect relations.*

The first perception when someone deals with military organisations such as the Army would be that they are clear in their structure and processes; even more we all know that there is a strong and formal command-and-control mechanisms to manage the organisation. Many assume that military organisations are likely to be linear rather than nonlinear. However, a deeper examination of organisational processes in the Australian Army reveals the opposite. An interesting contradiction exists between complex operational conditions (military engagements) and strict rules of command-and-control. This means that slow and cumbersome bureaucracy in some military organisations reinforces the necessity to blindly follow rules and orders, while warfare (that is complex by its nature) requires adaptation in anticipated ways. An opportunity to overcome such opposing phenomena is the informal networks of information sharing and informal adaptive cycles.

Through ALN it was confirmed the existence of organic, emergent networks that supports the Army in the way it shares information. We have produced an 'as-is' view of Army's informal adaptive network and in doing so we demonstrated an advanced level of their development, power and importance. The fact of their existence is not news for the Army; on the contrary, the value of informal networks is recognised. Moreover, the organisation is questioning itself in an attempt to find a way to incorporate strong points of formal and informal networks of knowledge sharing and blend it with an updated version of an organisational culture that is

supposed to be open to free access and distribution of information. This natural solution of speeding up information flows is reinforced by an existing action-oriented organisational culture that aims at developing quick appropriate response to emerging issues. However, there are some negative implications that relate to areas of strategic planning (discussed before). Besides existing informal networks of information sharing we discovered the existence of in-built, undocumented adaptive cycles that in turn represent informal processes of adaptation.

Thus, nonlinearity as a property of CAS can be found in the Army. It is represented through barely visible informal networks (both for information sharing and adaptation); networks that attempt to eliminate deficiencies of formal structure and processes and increase the pace of adaptation that is very important for the organisation working in a highly complex operational environment.

- ***Openness and Dynamic.*** *CAS has no defined boundaries and constantly exchanges energy and information with its environment, i.e., both agents and their environment can influence each other making changes in CAS constant.*

As discussed previously, military organisations are perceived as closed ones. Moreover, there is a common perception that they are difficult to change. It might have been true of the more stable global security environment that existed during the period of the Cold War. However, the situation changed with the collapse of the Soviet Union and the rapid technological development of the world that has led to our current interconnected global society. The Army like many other Western militaries needed to open up its boundaries to external interactions including those available from non-military industries. Going further, as the conditions of war have undergone change, new types of operations have evolved – that include coping with humanitarian, peacekeeping and natural disasters. New operations the Army

is being involved in require its engagement with the world that is not limited by military interests. Now the Army should be able to work actively within and cooperate with the wider 'community'. Thus, this opens the Army's boundaries to other organisations operating in various areas, while at the same time semi-closeness still prevails, since the organisation works within the interests of national security. We identified positive examples (LCBB and *Diggerworks*) of collaborative work between Army and other military and non-military organisations – they allow us to see that the Army engages with external players to achieve its goals. Moreover, a move towards joint forces initiates a shift in thinking in all three services (Army, Navy, Air Force) to open their boundaries in order to synchronise their efforts towards building a truly integrated capabilities.

There is no doubt about the complex and dynamic environment that the Army is now facing. The Army has participated in several operations over the last 15 years – East Timor and Solomon Islands, Afghanistan and Iraq. The dynamism of its work is enormous and pushes the organisation to adapt continuously. Moreover, the reviewed organisational change (AAI) was conducted at the period of time when the Army was committed to a number of operations. Without having an opportunity to stop military actions to focus on a change initiative the organisation leaders needed to conduct 'business as usual' and change Army at the same time.

- ***Emergence and Self-Organisation.*** *CAS agents have simple rules of behaviour; however, interconnectedness of CAS agents in combination with the nonlinearity or relationships among them makes it impossible to predict system's behaviour. As a result, unexpected patterns of behaviour can emerge through the process of agents' interactions. This in turn can lead to self-organisation of the system's agents into macro-scale patterns of behaviour.*

We identified an excellent example of self-organisation and emergence – the development of ALN. It was interesting to find out how the bureaucratic organisation allowed and supported a bottom-up development. The AAI interviews revealed the fact that the necessity to develop processes of organisational learning was recognised by the organisation itself. This led to formulating formal processes of lessons identification, collection and dissemination. We were able to see that it was an organic birth and development of an idea that emerged from the mid organisational level rather than dictated to by the top management. The most important fact is that leadership was supportive in allowing it to grow. Moreover, it was reinforced during the AAI interviews that such emergence and self-organisation was a desired property of the system pursued by the organisational change.

- ***Sensitivity to initial conditions.*** *CAS is very sensitive to initial conditions. Slight differences in initial conditions of two complex (similar) systems can result in moving these systems on absolutely different directions. This fact complicates the process of predicting CAS behaviour as experience of one CAS can be hardly applicable to the analysis and forecasting another.*

This is an abstract property that is difficult to relate to practice. However, in the case of the Army we connect it to the high level of unpredictability of the future state, conditions and properties of warfare. The dynamism, complexity of interactions, ease of access to technologies and the emergence of new ways of conducting war make it impossible to precisely plan for future warfare. In such a situation any change now in any area of the global security environment and economy can lead to a significant shift in the situation tomorrow. This forces both allies and enemies to adjust their actions in unexpected ways.

The Army recognizes this challenge and its response was the development of a role that aims to plan the Army's development at a strategic level. Undoubtedly, there are a number of projects being conducted with the goal is to develop major equipment capabilities for the future. However, in the conditions of uncertainty it is recognised that the most important aspect of future success is connected with the development of Army's personnel to make them capable of coping with any possible scenarios of future warfare.

- ***Adaptation*** *is a process that allows a system to operate in its environment through the continuous monitoring environmental conditions and adjusting system's behaviour accordingly.*

This whole thesis is devoted to the crucial property of organisational adaptability and a particular case of adaptation. We were interested to know to what extent the Army was adaptive. Through the AAI interviews it was found that adaptation is naturally in-built into the system as it was continuously changing itself through a number of programs that preceded the Adaptive Army. During the last decade the Army initiated a number of significant organisational changes that preceded the Adaptive Army (such as Enhanced Land Forces, Hardened Network Army), to adjust its functions and structure to the modern environmental needs. Moreover, the Adaptive Army was not supposed to be the end state of the organisation. On the contrary, it was perceived as just one step in the process of constant adaption leading to next adaptive cycles such as Plan Beersheba and Building on Beersheba. This underlines the fact a huge effort is being made to think about possible future states of operational environments as well as to design and implement new adaptive actions to ensure that the Army corresponds with its external requirements and needs. As one would expect, military organisations such as the Army have no other way but to put themselves on an adaptive footing. It is more than a question of effectiveness but deals with

human life and national security in general. Whatever actions are forced upon it – all pursue one goal, namely to develop a structure and processes that allow it to develop forces that are capable of maintaining a high level of adaptability in any uncertain situations they face in operations.

Looking at the Australian Army it is possible to see its obvious success in conducting its main business – defending the nation and fighting wars. Seven wars since 1945, including recent ones in Iraq and Afghanistan, did not create any stunning negative news or dramatic events. On the contrary, the Australian Army adapted to any kind of new war. Moreover, over less than one hundred years the Australian Army has succeeded in reorganising itself from a small infantry-centric land force into a world-class military organisation with a strong international reputation. Starting from these limited self-supporting capabilities, the Australian Army has mastered a way of conducting various types of operations (including counter-insurgencies, disaster relief and peacekeeping) as a part of a bigger joint entity both within the ADF and international allies. The Army now is a professional military organisation with a strong emphasis on individual and collective training which works efficiently with its traditional and regional allies; it is an organisation that has a very strong support and admiration among Australian citizens and that continue to provide capabilities to maintain global security.

We also learned an important mechanism of adaptation that is conducted through processes of organisational learning (ALN study). The structure of ALN was developed in such a way that it collects and analyses lessons in four temporal learning domains, referred to as learning loops: immediate learning loop (ILL), short learning loop (SLL), medium learning loop (MLL) and long learning loop (LLL). Each domain works with its own needs and within own speed, by doing that, they maintain necessary adaptive loops to

respond to various threats and utilise incoming opportunities. Moreover, all domains are linked with each other in a way that allows the Army to disseminate lessons across the whole organisation. A common point of lessons is a centralised database that makes it possible to store information and make it available to the organisation. A shared point of information is reinforced through the usage of a technological means of communication making access to the database easy and possible through any place that has an entry point to the protected network of computers. Despite the fact that several issues were identified that reduces a more sophisticated usage of the ALN, it was still acknowledged the importance of the learning processes and their impact on the way the Army adapts itself to both tactical operational needs, capability development requirements and strategic long-term planning.

- ***Feedback loops.*** *The ability of a system to use its own outputs to control inputs or processes. Feedback loops and the process of choosing successful variations are inherent parts of adaptation. This implies the existence of the concept of success and failure and the rules of evaluation system's results.*

Finally, we identified that feedback loops are inherent for CAS. We had a chance to get a general perception on how they work in the Army. This was done both through the ALN study and the AAI interviews. We have highlighted some obstacles to proper feedback mechanisms in the Army such as an action-oriented culture that focuses on fixing an issue and moving on to another one without necessarily checking if expected outcomes have been achieved. It was also identified that there is a focus of attention from validation of results of implemented action to verification of the fact of implementation. And finally we discovered that measures of success and failure are not properly formulated in some instances, leading to shortcomings in evaluation of the change outcomes. Furthermore, feedback

is conducted mainly through a formal bureaucratic structure that negatively impacts on the speed of the process. To counterbalance it we discovered that a positive shift in feedback mechanisms still exists through the introduction of new means of communication (social media) as well as positive examples of LCBB, *Diggerworks* and AWB[51] that provide evidence of Army's ability to develop proper feedback mechanisms.

Our a general conclusion is that the Army still operates in such a way that it puts feedback mechanisms in place. Like any process of adaptation, it is hard to achieve the best solution straight away; therefore, adaptation forces the system to conduct incremental steps of adjusting previous adaptive actions and their results to the current operational needs and requirements. From this perspective, it can be seen that current feedback mechanisms in the Army are not perfect but can be perceived as adequate and good enough to allow the organisation to run its business in an effective manner. Moreover, many areas we discussed during the AAI interviews were confirmed to be work-in-progress; that indicated a process of ongoing improvement. Thus, the Army attempts to correct and reduce current shortcomings and inefficiencies and demonstrates examples of feedback mechanisms and utilising them. This is a property that distinguishes it as a CAS.

4.6. Summary of data analysis

The chapter has covered the terrain of knowledge relevant to the development of the leading ideas of the thesis. A number of important insights have emerged that taken together help to describe the reviewed case of organisational change, organisational learning and general properties of the Army's adaptability:

[51] AWB is a part of the SLL that is one of the learning cycles of the ALN.

✓ We conducted the study of organisational change in the Australian Army through both the Adaptive Army Initiative program and Army Lessons Network, through which we demonstrated and confirmed that the Army is a complex system.

✓ The process of organisational change was described though the interpretation of the insights of the designers and implementators of change. A learning cycle based on the ASDA loop (act-sense-decide-adapt) was used to describe this particular case of organisational change. We also discussed change outcomes in relation to change initiative original goals by discussing achievements in general and specific terms (training continuum, information flows, alignment with joint forces command and strategic planning). Finally, possible areas for further improvement were discussed.

✓ General characteristics of adaptability in the Army were discussed allowing us to continue the conversation on organisational adaptation by utilising the CFA. A number of major themes were identified:

- We provided examples of classes and levels of adaptation in the Army.
- We discussed organisational learning as the Army's ability to extract lessons from various sources such as own operational experience, other militaries and business organisations.
- The next part focused on a general discussion about feedback mechanisms – some obstacles have been illustrated (bureaucratic structure and action-oriented culture). However, we also identified a positive shift in the way the Army feeds information back, achieved through the introduction of modern means of communication (social media).
- A description of the Army's thinking on the way it prepares itself for the future was provided. Here we provided examples of possible institutional lessons that can be extracted from recent operations. Then

we highlighted that the future success of the Army depends on its personnel – by saying that, we demonstrate the Army's vision of its role and its value of individuals and human resource development. It was also possible to cover emergent ideas of developing organisational adaptability in the Army – it is believed that a wider awareness and acceptance of complexity, organisational culture, leadership and continuous modification of the organisational structure are crucial aspects. We discussed options that might be usefully implemented to support the Army if it faces different operational threats or enters a period of low operational tempo. Finally, we indicated aspects of the Army's adaptability: adaptability at different organisational scales, bureaucratic processes, diversity of knowledge and experience, habits of knowledge sharing and the utilisation of lessons, and comparison with other Western armies.

- ✓ Processes of organisational learning have been described and analysed through the formal review of the Army Lessons Network (ALN). A number of issues were identified leading to practical recommendations for its improvement. The CFA was applied as one of the tools to support this review. Through the ALN review it was possible to see what role organisational learning plays in the process of organisational adaptation.
- ✓ Finally, we demonstrated that the Army is a complex adaptive system as it demonstrates all the characteristics of CAS. We see the CAS theory as a way to perceive military organisations and think about ways and means of its management as CAS represents a good tool to understand the internal and external dynamics of organisational work in conditions of uncertainly and continuous change.

In the following chapter attention turns to the knowledge contribution of the thesis.

Chapter 5
Discussion and conclusion

This is the final chapter of the thesis. It represents theoretical thinking on organisational change being conducted in the Australian Army. The main goal is to take a step back from the practical aspects of organisational change in the Army and conceptualise knowledge gained from the current case study. For this we compare and contrast obtained knowledge with ideas of CAS. However, to reach this point we would like to take two further steps: summarise what the research is about and what has been done, and answer the research questions. Then, in the next section, the most important one in this chapter, we focus on the knowledge contribution that consists of two major parts: adding insights to the CAS theory and extending the CFA as a tool to appraise organisational change. As a part of knowledge contribution we also discuss what defines an adaptive army. Finally, we conclude the chapter with ideas for further research directions that arise from observations and earlier re-workings of a model of organisational adaptability. The overall chapter structure is outlined below (Figure 40).

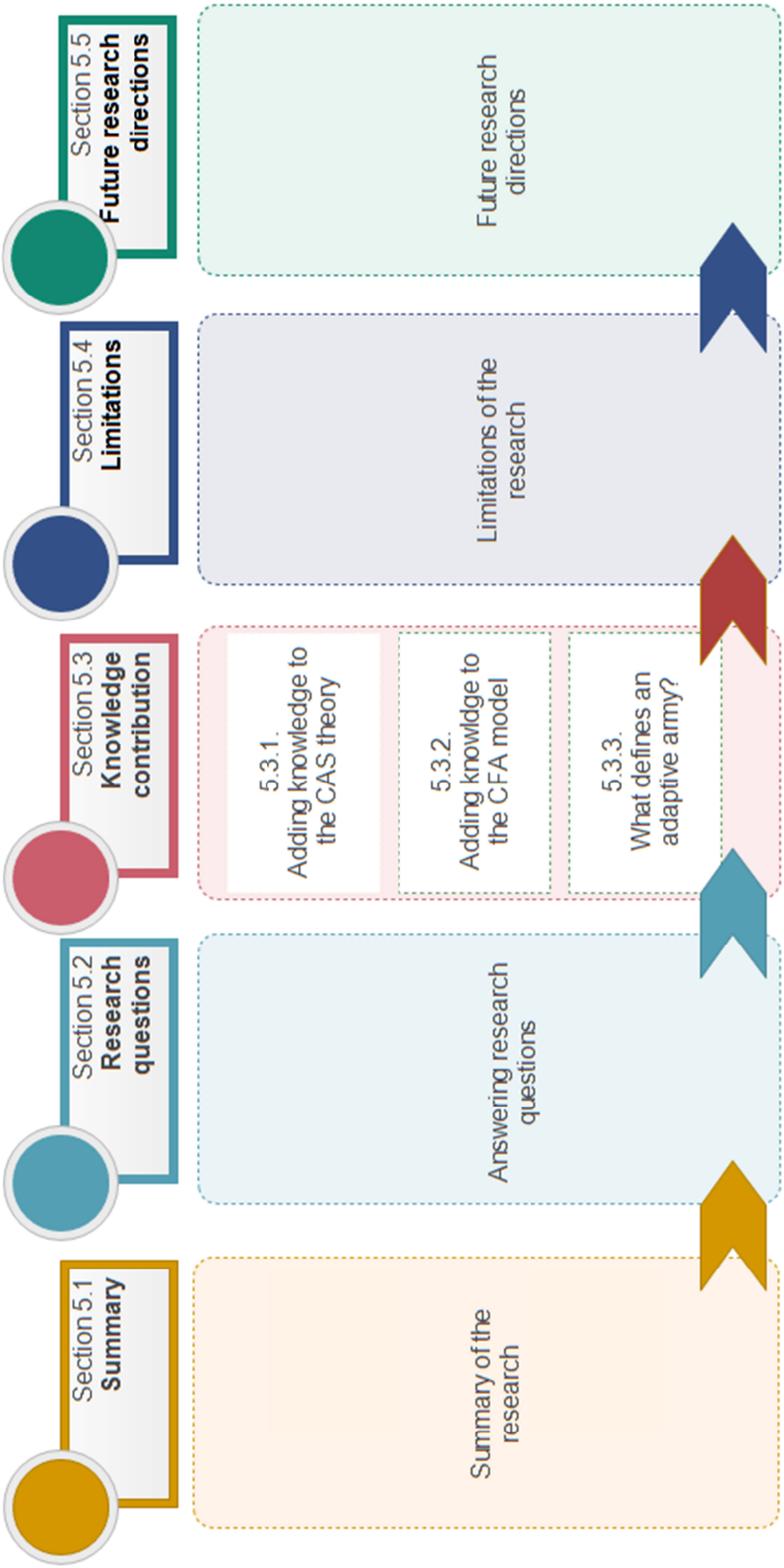

Figure 40. Structure of the Chapter 5.

5.1. Summary of the whole research

This section aims to summarise the research that was conducted and explained in this thesis. It does not include contributions to knowledge, but simply explains the main focal points that drove the research interest from the outset.

The initial motivation for the research was to understand how modern military organisations adapt themselves in response to drastic changes in its operational environment. This curiosity forced me to review the literature on organisational development, organisational change and organisational learning. I found that classical theories of organisational change are constrained by assumptions that conditions of organisational work have a manageable degree of stability, meaning that organisational change and management mainly depends on the professionalism and experience of managers. Moreover, the internal structure and processes of organisations are perceived as linear ones that can be easily be understood and managed. These two important assumptions suggest that it is always possible to identify the best organisational structure and processes in order to make it effective (Ford's model of management is the clearest example). The social domain of the organisation (the ability of people to influence its work) was reduced to a minimum as human resource management viewed employees rather as tools than an intellectual capacity. However, we perceived modern military engagements differently. The collapse of the USSR, the development of new technologies and globalisation created new opportunities both for the military and its enemies. It was a general acknowledgement in the literature devoted to organisational development that classical methods of organisational management were failing in providing desired outcomes as they faced a significant number of unknown interconnected elements and a high degree of dynamism in areas of their work. These new conditions, in

turn, impede the chance of designing the best possible solution. Moreover, it was also recognised that military engagements have become ever more complex, dynamic, unpredictable and diverse by their nature. Thus, a demand for new ways and means of management in military organisations became obvious. This turned our attention to complexity theory and its particular branch of CAS theory. It promised a collection of ideas that describes closely enough the nonlinearity, uncertainty, dynamics and unpredictability of the world we all now operate in. On the other hand, a boost to the CAS development felt during the last two decades of the 20th century making its tools and methods not mature enough to be applied to real-life organisations. However, it was clearly understood that before developing practical tools of complexity theory it is worth learning about what we are dealing with. In that case the application of CAS theory to build our understanding of modern military organisations is justified as it opens up an opportunity to learn about them from different perspectives and extend our general knowledge.

Thus, the next step of the research focuses on identifying a suitable description and models of organisational change from a CAS perspective. Moreover, we deliberately focus our search on organisational adaptation or adaptability that, from our perspective, describes the ability of the organisation to deal with change (note: it is possible to conclude that terms *organisational change* and *organisational adaptation* are interchangeable in CAS theory as they mean the same process of dealing with change). It was a bit of surprise to find out that there are not too many models that can be used. Some of them are too general and descriptive, while others aim to model particular processes of adaptation. Despite this fact we were able to identify one framework (CFA) that looks to be an umbrella for all the characteristics and processes that are necessary to allow for organisational adaptation. This

work proved to be a real inspiration; thus, the decision was made to use CFA to appraise organisational adaptability. That was a promising call as it opened up an opportunity to improve our knowledge of CAS through the understanding of how complex organisation works as well as apply CFA for the first time to appraise organisational adaptability.

Fortunately enough CFA was developed by the DST Group in the same city (Adelaide) where the researchers were located. Taking advantage of that we contacted the author who happily agreed to collaborate with us in developing this practical application of CFA. In the end (without going into too much detail about the work) we were lucky enough to build a contact with the Australian Army through this DST Group and conduct a particular study of organisational adaptation in the Army. The Army was open to accept CFA ideas, as it is the most familiar framework for it in helping to review complexity of both modern warfare and military organisations.

Thus, the research focuses on reviewing a case of organisational change that was conducted in the Australian Army in 2009 and called the *Adaptive Army Initiative*. It was one of the responses of the Army to dynamic and complex conditions of war. The Australian Army represents an ideal-type organisation for the researcher since its purpose is to be successful in warfare, something that is acknowledged to be a complex event by its nature. The research findings are based on the analysis of a number of interviews (19 in total) with senior and mid-ranking Officers employed by the Army as well as people external to the Army. We were able to gain access to those people who had already perceived the need for organisational change, had initiated, designed and supported it; thus we were collecting information straight from the horse's mouth. Moreover, we were able to learn processes of organisational learning through the review of Army Lessons Network (ALN) that helps us to understand and confirm that learning is a crucial mechanism

of adaptation – thus, to link findings of the ALN review with the ideas of organisational adaptation. By appraising a case of organisational change and studying processes of organisational learning we utilised CFA as a means to understand how a complex organisation like the Army adapts. A general approach was to conduct a qualitative research that builds subjective interpretation of the reality obtained through understanding of knowledge and experience of people. Having obtained this information we were able to interpret and tell the story of how the Army had changed itself through the *Adaptive Army Initiative* program.

The main focus of this chapter is on the final part of the research – its knowledge contribution and further research directions. This consists of three remaining parts. First, we answer research questions that have driven the research. The second part deals with those aspects that can add to general CAS knowledge – that is what we learned about the Army as a complex adaptive system that had not been included in the theory before; including specific contributions to CFA as a tool of CAS to appraise organisational change. Then we would like to talk about what defines an adaptive army. Finally, we demonstrate further research directions.

5.2. Answering research questions

While the whole thesis represents a study of the changes in operational environment and the way the Australian Army has adapted to them, this section aims to provide short answers to the research questions in summary form only.

RQ1. In modern times, how has the Australian Army adapted to new challenges to operational effectiveness at the whole system organisational level in response to significant changes to the nature of warfare and related military engagement?

Answer to RQ1. Global events in recent decades have involved the Australian Army in non-traditional operations and shifted a general understanding of global security and warfare. These new conditions of war also demonstrated a need for adaptation as well as revealing the need for an increased speed of deployment and broader types of operations to cope with humanitarian, peacekeeping and natural disasters. In this continuous battle of adaptation the Army has achieved obvious success as demonstrated by successful operations during last hundred years both as 'special' and 'conventional' components. During the last decade the Army has initiated a number of significant organisational changes (such as Enhanced Land Forces, Hardened Network Army, Adaptive Army Initiatives, Plan Beersheba and Next after Beersheba), to equip its functions and structure to modern environmental needs. Over less than one hundred years the Australian Army has managed to reorganise itself from a small infantry-centric land force into a world-class military organisation with a strong international reputation. Starting from limited self-supporting capabilities the Australian Army has mastered varying types of operations (including counter-insurgencies, disaster relief and peacekeeping) as a part of a bigger joint entity both within the Australian Defence Forces (ADF) and in cooperation with its international allies. This summary essentially is drawn from an extensive review of the relevant literature and underlines a long story of continuous improvement in capability in line with what is expected of a professional army.

RQ2. What importance should be attached to two recent Army leadership initiatives AAI inspired by the need to meet the challenges of change?

Answer to RQ2. The reviewed organisational change, AAI, demonstrated that the Army is alert to the problem of organisational adaptability in a changing environment and that a strategic response takes place. The

existence of the AAI underlines the point that the modern Army has embraced the idea of continuous improvement through innovation management using multiple ways and means.

RQ3. What effective difference have these initiatives made, as perceived and interpreted by senior Army leaders?

Answer to RQ3. The AAI should be regarded as a long-term strategy with changes taking place on a continuous basis arising from its catalyst effect. In fact, the AAI has been superseded by other strategies, called Plan Beersheba and Building on Beersheba, which in effect continues the process of organisational adaptation. Although it is difficult to precisely measure effectiveness of the organisational change, the AAI should be regarded as a necessary intervention to disturb the system and create different ways of thinking and action in readiness for complex events.

RQ4. Taking the AAI and ALN as change drivers in the Army, in what ways can these initiatives be understood as practical expressions of CAS theory?

Answer to RQ4. As shown in the data analysis the interviewees on reflecting in the impact of the AAI demonstrated as least an implicit awareness of the complexities of a modern army with a close correspondence to the leading ideas of CAS. Moreover, a detailed review of the ALN demonstrated the importance of learning processes in the way the Army adapts and allowed a close examination of the CAS ideas in the modern Army.

RQ5. Taking the insights and interpretations of the senior Army Officers about these two change drivers, what new theory-building contribution can be made to existing CAS theory in relation to the adaptive capability of the modern Australian Army?

RQ6. Using single case study of the Australian Army how can CFA be evolved to both improve its theoretical basis and practical application?

Theory-building questions, RQ5 and RQ6, are addressed below.

5.3. Knowledge contribution

5.3.1. Adding knowledge to CAS theory

CAS theory is understood to be a useful tool to understand the complexity of modern military organisations. It provides a number of characteristics that single out complex system from static, simple (or even complicated) and linear ones. However, based on the research findings we were able to highlight some areas that have not been discussed by CAS but represent valuable insights into what aspects of complex system should be also taken into account.

Figure 41. Colony of ants
source: National Geographic website

The greatest discovery of the research is the way CAS are described and perceived. The definition of CAS tells us that they consist of a number of interdependent agents that operate based their own rules of behaviour but pursue the system's goals. The clearest example, provided in many literature sources, is a colony of ants that work for one common goal (Figure 41). Each ant is driven by its individual role and, let's say, responsibility and acts in accordance with circumstances, but somehow through self-organisation and the emergence of new patterns of behaviour it contributes to the overall success of the anthill. We are still amazed by the level of sophistication that

the anthill has achieved in a way to operate as one single, complex and adaptive entity that is composed of a huge number of simple ants. That gives us a good illustration of CAS and helps to build a real-life visual picture of what it is. We found that literature on CAS is mainly based on our understanding of complex adaptive biological systems; and it is claimed that systems that consists of and are operated by human beings, can be viewed from this CAS perspective. There is no doubt that this is true: if we look at markets, traffic systems, urban planning, airline networks, seismology, virus research and other instances of human activities, we will see that all of them exhibit characteristics of CAS (refer to 'Theories of Organisational Change and CAS' of chapter 2). Thus, it is widely acknowledged that CAS provides valuable insights into our understanding of how we design, operate and manage systems.

However, recent research into the Australian Army demonstrated that the literature lacks explanation of CAS as a *socio-cultural* system that consists of human beings whose intellectual capacities are much higher than those of ants. Moreover, people have a number of different agendas that bring them together within an organisation and make them act as a whole unit. While general rules of behaviour are dictated by organisational processes, policies and procedures, there is still a big shadow over what people actually think, how they interpret information and what influences their behaviour. From this perspective the existing *mechanistic* view of CAS dominates literature and decodes principles of biological systems into a set of characteristics, but it does not give a full picture of such a complex adaptive system as an organisation. By saying that, we do not eliminate the meaning of the existing CAS characteristics as they represent a good set of ideas that help us to understand the dynamic nature of a complex system. But we rather claim that it represents an advanced view of the classical approach to

organisational management (referred in the literature review as modernist period), where organisation is viewed as a black box that produces change through causal relationships with a strong emphasis on managers as rational decision-makers (Demers 2008). The difference is that CAS agents and their causal relationships have become nonlinear, fast, and diverse, but managers are still those who can offer better solutions and perceive an organisation as a set of manageable parameters. Thus, a mechanistic view of CAS seems to have many similarities with those ideas of organisational management that give the primary role to managers and its ability to control and organize processes. In that sense properties of CAS such as self-organisation and emergence become a bit blurred while we still understand them through examples of spontaneous unexpected behaviour of biological systems. Other CAS characteristics can be easily fit the classical theories of organisational change, while their representation will be limited by linear thinking of management.

However, as it was discussed in the literature on organisational change – a new period of organisational science started with the Hawthorne studies in 1920s. These experiments are important as they introduced *"humanness of being"* (McAuley, Duberley & Johnson 2007) and *"emotional and intellectual wellspring of the organizational behavior"* (Shafritz, Ott & Jang 2005).The main feature of this period (referred in the literature review as neo-modernist period) is a shift in thinking related to positioning people within an organisation and considering their influence on its operation. From that point in time, it was getting harder to deny the existence of other parameters, cultural and unknown rather than certain, that could significantly influence the whole organisation. Moreover, unpredictable aggregation of these parameters leads to unmanageable positive or negative impacts on the whole organisation.

While complexity theory is a part of the next period of development (postmodernist) we found that it still lacks the human touch in its explanation that has been so actively introduced since the Hawthorne studies. Our current research was initially focused on the appraisal of *processes* of organisational change. However, after that we found out that there was a set of other system's parameters that could not be easily placed in any of the boxes that simply tell how the change was designed and implemented. These parameters concern those areas that transform a *mechanistic* CAS into *socio-cultural* system. This transformation represents the way our current research contributes to the CAS theory.

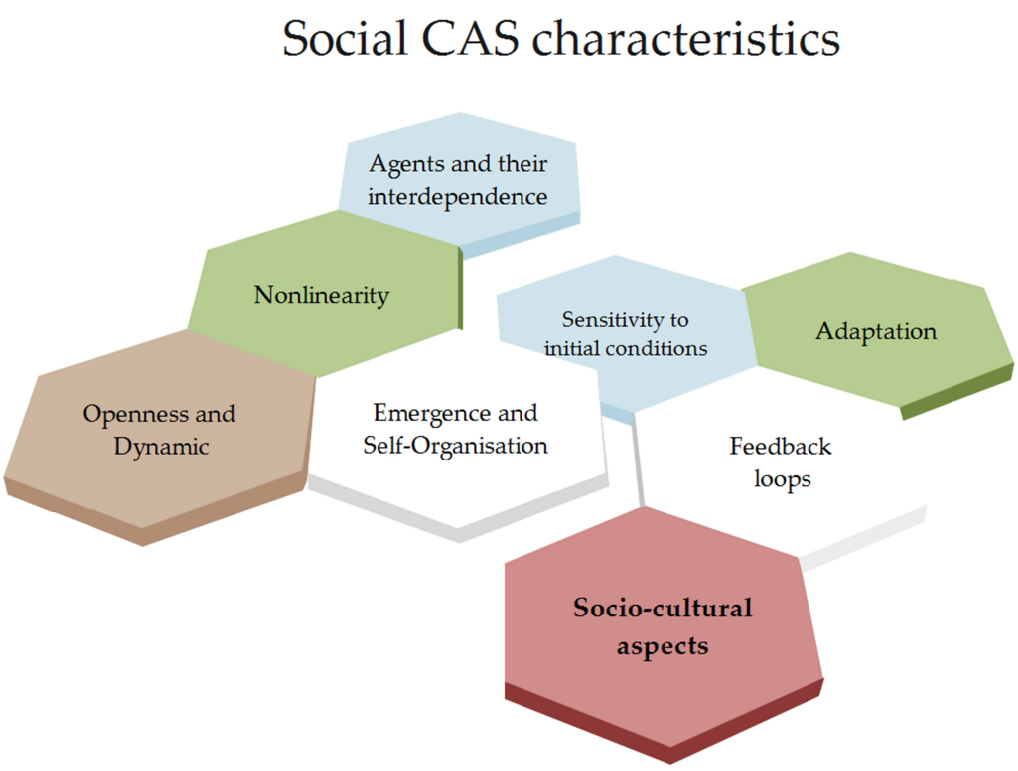

Figure 42. Social CAS characteristics

Thus, we state that it is necessary to add an extra dimension to CAS that deals with organisations, firms and companies – a dimension that will indicate the *socio-cultural* aspects of a complex system as those that add extra layers of complexity and have a significant impact on organisational

effectiveness and success (Figure 42). Therefore, it is necessary to make a clear distinction between complex systems that describe biological entities and those that attempt to explain human enterprises. It is important to acknowledge that our intellect, background, motivation and many other parameters of our life contribute enormously to how we behave, deal with each other and work. Despite the fact that it might look very difficult to determine and measure – it is still crucial to introduce these socio-cultural aspects to the CAS description. We acknowledge the fact that topics on organisational culture and leadership have existed for many years. However, here we would like to stress that this human side of organisational activities have not been explicitly expressed in the CAS theory. It should be noted here that based on the research findings it is not possible to determine details of these socio-cultural aspects, but rather the research underlines their importance and opens new direction for further investigation that are discussed later.

5.3.2. Adding knowledge to the CFA model

Having acknowledged the existence of the *socio-cultural domain* of CAS, we would like to focus our attention now on those specific areas that can extend CFA being offered as a tool of complexity theory. Based on the data analysis it was possible to conclude that there are two main aspects that comprise the socio-cultural domain – *leadership* and *organisational culture*. That is not a big surprise as much of the literature refers exactly to these two points when describing the socio-cultural domain of an organisation. The description below provides our insights into attributes of leadership and organisational culture that promise to add more value to CFA when one attempts to apply it in order to understand organisational change or adaptation. However, in arguing for a socio-cultural perspective on CAS and CFA in particular we became aware of deeper layers of insight and explanation that would require

further investigation. More about this matter can be found in the Further Research Directions described later. Below we provide findings that are based on the recent case of organisational change in the Australian Army.

5.3.2.1. The importance of leadership

As was discussed before in the literature review, we perceive leadership as one of the key socio-cultural aspects of any organisation. Thus our research findings only confirm this view. But more than that, we attempted to build a description of leadership that supported the process of organisational change. Below we express three main attributes of *an adaptive leader* (implying leadership style) that aims to drive organisational change:

- an adaptive leader is a person who has *a clear vision of the future* and demonstrates his/her passion to achieve it. The literature extensively supports this attribute. For example, a study of strategic leadership, conducted by the ADF in 2013, singles out a strategic leader role that makes sense, interprets, communicates and engages with other systems in order to continuously align the organisation with its external needs and circumstances (Jans et al. 2013). The same idea can be found in relation to leadership that focuses on developing entrepreneurship endeavour through claiming that founders of a new firm choose the basic mission in which they believe in and use it to build and develop the organisation (Schein 2004).

- an adaptive leader is a person who leads the change process by *identifying and communicating directions of development* to people rather than giving a prescriptive plan to follow. This is an attribute that underlines the importance of open dialogue and discussion between a leader and his/her subordinates. During this research we identified the importance of providing directions for change; however a key feature of this process is to keep organisational flexibility that allows people to figure out appropriate

solutions. As Schein further states, an organisation is an entity that consists of people that share the same goals and will. The underlining assumption here is that employees are driven by the same vision and attempt to reach the destination determined by a leader (or founder). Leadership here is presented though a mission and vision that are determined, reasoned and communicated by leaders.

- an adaptive leader is a person who *develops an adaptive culture* that encourages and stimulates open communications, supports and appreciates people's enthusiasm, rewards active contributors and provides support to people struggling with new ideas. Below we demonstrate some aspects of organisational culture. However, to demonstrate the importance of leadership to reinforce organisational culture we refer to Huber's statement that explains that the top management of future organisations will actively try to influence organisational culture as it represents one of the strongest mechanisms to motivate, encourage and support employees (Huber 2004).

As can be seen – proven characteristics of leadership are neither precise nor distinctive. They rather show a leaders' approach to managing a general organisational development that supports open discussion of ideas. Moreover, the literature tells us that there are many different leadership styles that differ from organisation to organisation and even from country to country (Northouse 2009). Thus, we are not trying to discuss our findings in relation to any of them, but highlight some overall principles of leadership and demonstrate their importance in representing CAS (through CFA) as a social system.

5.3.2.2. Organisational culture

Organisational culture is an aspect of a socio-cultural domain that is not easily explained. A general definition citied by Huber describes it as *"the set*

of beliefs and values that is widely shared and strongly held throughout the organization" (Huber 2004, p. 240). Isn't this too general an explanation that provides only a sense of what organisational culture is? However, it is not a trivial task to define it in detail. What we can offer is our insights into what aspects of organisational culture can add value to CFA. We do not claim our interpretation to completely provide a general understanding of organisational culture, but we believe that it can help one to more fully utilise CFA as a tool of appraisal of organisational change and adaptation. Again – we acknowledge the fact that there are deeper layers of insights and explanation that would require further investigation – these are discussed in the Further Research Directions later. Here we provide findings that are based on the recent case of organisational change in the Australian Army. We were able to mark out four features of organisational culture: action-oriented aspect, tolerance to failure, habits towards knowledge sharing, and acceptance of change – each of them is discussed separately below.

- **Action-oriented culture**. We found that an organisational culture can be distinguished as being action-oriented. The simple explanation of this fact is that an organisation focuses on identifying *practical* solutions for existing (and hopefully incoming) threats and opportunities as soon as they emerge or are foreseen and *move on* (to the next issue) when the action is implemented. Putting it simply it represents the concept of '*fix an issue*'. This is a strong positive aspect that allows an organisation to move efficiently enough through uneven landscape of circumstances. For such organisation as an army when an action is happening here and now, there is not too much time and other resources to gradually plan and implement change. It is more likely that an army will find itself in a situation when a solution should be developed sooner rather than later in conditions of limited resources. Thus, an action-oriented culture represents the right attitude for an organisation

where work is related to extreme conditions, such as war where change is constantly demanded, forcing soldiers to do their best in any given circumstance. This habit of acting as best as you can in the current moment, treading a fine line between constantly emerging issues, is then brought from a battlefield to organisational work – making an army action-oriented in everyday life. This leads to the most positive outcome of such a culture in that it can allow an army to achieve results independent of the resources available.

However, there is another side of the coin that should be highlighted – the disadvantages or downside. One of negative implications of this action-oriented culture is the fact that employees can focus more on actions that are easier to implement and outcomes that can be observed quickly. As a result, the attention is switched to tactical and operational issues and opportunities. This in turn can leave strategic lessons being partially neglected or ignored as they usually require more effort to be implemented; moreover, their outcomes require more time to reveal themselves and sometimes are not that obvious. Furthermore, an action-oriented culture can also limit an organisation to fully utilise its intellectual capacity that is spread across its employees. It means that the focus on 'fixing an issue' can eliminate an employees' ability to think and develop unique (out of the box) solutions that can differ from existing practical approaches. Finally, we found that an action-oriented culture can limit organisational learning as it can avoid searching for past lessons because of the habit of developing practical actions as soon as possible.

- **Tolerance to failure** was identified as one of the features of an organisational culture. Some of the literature describes it as a 'blame free' approach to work related faults and issues. However, the meaning remains the same: we all make mistakes, but instead of blaming, or even punishing

each other, it is worth transforming them into a learning experience and focus our thinking on a way to fix them. While a 'blame free' culture represents a positive extreme of the overall organisational tolerance to failure, it is necessary to list some possible negative aspects of the other view.

In the event of an organisation not admitting mistakes – there may be several implications as to its overall level of adaptability. As was mentioned before, *measures of success and failure* represent an important set of parameters that are used to understand the effectiveness of the implemented action and its impact on overall organisational success. These measures are formulated by people and represent their interpretation of reality (in other words, we create *proxies* to express reality in some measurable terms) – this in turn is a limitation that is put on organisational adaptation. However, more than that, measuring success or failure in conditions when mistakes are not acceptable can lead to proxies that aim at demonstrating only positive outcomes. This approach neglects the fact that any implemented action can fail and this failure should be detected, thus this approach may lead to an unconscientious ignorance of possible errors since they are not acceptable. Furthermore, zero tolerance to failure limits organisational adaptability since it does not allow an organisation to learn through its own mistakes and utilise them as one of the drivers for adaptation. Finally, an organisation that does not accept mistakes limits its own ability to fully utilise the intellectual capacity of its employees as it lacks openness to new ideas and innovation making employees very cautious when expressing their ideas.

- **Knowledge sharing**. Here we would like to stress the importance of how people perceive and organise knowledge. The previous century was marked out by conditions of information superiority when knowing more meant being better. Now in conditions of globalisation and with the advantage of modern technologies information has become available to a

wider community and greater number of people. Thus, knowing more does not give significant advantage since a single portion of information represents less value than those given a bigger picture perspective. However, the habits of the previous industrial century hold us back from free information sharing. The same is true for organisations. We claim that a part of organisational culture should pay attention to the way information is shared among employees. It does not mean the design and review of formal processes of organisational learning, but rather concerns the attitudes and habits that people have to control what they know and access what they want to know. Thus, organisational adaptability is supposed to be improved and reinforced if it is widely accepted, believed and practiced – in other words *knowledge sharing is power* not knowledge is power. Moreover, we should also pay attention to the informal side of communication and knowledge distribution as it can play a big role in the processes of organisational learning.

- **Acceptance of change.** Even if a change is designed at top management level, it is likely to fail if an organisation is not ready to accept it. From our perspective, it is possible to distinguish two ways of acceptance. The first one is simply to agree or disagree with the proposed changes and therefore follow them or not. We are not interested in this particular aspect since we believe it has been discussed in much of the literature sources that talk about workplace conflict management. What we are interested in is the second dimension that deals with *change fatigue*. By change fatigue we mean *the human capability to accept change* that is an intellectual and psychological ability of employees to work within constantly changing conditions. More than that it represent an overall organisational capacity to change as a whole entity. Change fatigue represents a general understanding of organisation that can be expressed through:

- the 'volume' of change that people can take at a particular time, and
- an understanding of to what extent it is possible to persuade employees through introducing new change concepts before they are intellectually and psychologically exhausted (how much change is good enough).

As we discussed before, an organisation is a social CAS that consists of human beings. Besides the intellectual capacity that people have and through which they can contribute to the overall organisational work – people have intellectual and psychological features that may limit their ability to change at a certain speed (pace). A *pace for change* can vary from organisation to organisation from circumstances to circumstances. Therefore, any organisational change that is being introduced, as well as other subsequent steps, needs to take into account the level of *change fatigue* that an organisation is experiencing.

However, research reveals that modern armies work in dynamic and unpredictable operational conditions that require them to change and adapt continuously. In these circumstances adaptation becomes the reality of the modern army, its '*lifelong learning experience*'. Now it has become even more obvious that it is a requirement for an army to keep adapting since if an army does not keep the adaption mechanism working – it is going to fail. Yet failure for an army is a hardly acceptable[52]. Thus, the only way to maintain an appropriate level of effectiveness and success is to develop an organisational culture that is open to change and able to withstand and operate within the conditions of uncertainty and continuous change by managing its change fatigue accordingly.

[52] Lieutenant General Ken Gillespie interview

5.3.3. What defines an adaptive army?

The final part of the knowledge contribution relates to a discussion of the general characteristics of an adaptive army. We acknowledge that a generalisation using this list of parameters is limited since the research focused on the organisational adaptability of one particular army. However, we believe that it will open discussion for further research directions and help one to continue discovering what contributes to organisational adaptability in an army. Before proceeding to a general list of characteristics that distinguish *an adaptive army*:

✓ We start from *defining adaptation*. The literature review provided a number of distinctive features of adaptation, but below we would like to provide another perspective. We used to perceive adaptation as a big event that challenges an organisation to change in response to external requirements. It was claimed that the postmodernist period has transformed the view on change from incremental to drastic, saying that incremental change is not enough to cope with dynamic conditions. However, considering adaptation it is necessary to take into account another way of change. In particular, sometimes reality shows that the process of re-building (drastic change) within an organisation is more time consuming than adjusting to it (incremental change) with modified requirements. Thus from this perspective, adaptation should also include the process that reinforces existing processes rather than only focusing on a big change event. This shows another side of adaptation that is a conservative process that focuses on what is been currently done rather than introducing a change.

✓ An adaptive army has *leadership* that commits, guides, prioritises and inspires the change, and deals with challenges. Through its leadership an army is continuously scanning its environment to identify long-term needs for change.

✓ An adaptive army has an *adaptive organisational culture* that advocates free distribution of ideas and knowledge and is supported by leadership. Moreover, the philosophy and ideas of adaptation are maintained, practiced and encouraged at all organisational levels with strong support from its leaders.

✓ An adaptive army is the one that nurtures the adaptability of its people. The main strength of an army is its personnel; thus, an adaptive army relies on its employees and develops *adaptive individuals*. The goal of an adaptive army is to have human resource practices that develop adaptability in individuals. As it is not possible to predict future conditions, organisational adaptability depends on people who can adapt to the changing environment. Thus, in case of any possible future external conditions, adaptable people are the main asset of an adaptive army.

✓ An adaptive army is culturally ready and *open for change*. Through its adaptive individuals an adaptive army is the one that is open to and continuously seeking for opportunities for change. Moreover, organisational readiness and openness to change is maintained through proper communication of the need for change at all organisational levels.

✓ An adaptive army reinforces the importance of *feedback mechanisms*. It tracks results of the change through feedback loops to evaluate and further improve results. An adaptive army monitors and reviews benefits, unintended negative consequences and risks associated with the change as well as reviews decisions that led to changes to make necessary adjustments.

✓ An adaptive army realises the importance of *measures of success and failure*. It admits that measures of success and failure should represent reality correctly to support the proper collection of feedback. An adaptive army

further concedes that understanding failure plays a crucial role in the process of adaptation; thus it learns its faults.

✓ An adaptive army is able to change in accordance to *different conditions* of the external environment. Changes that are faced by an army can differ significantly; an adaptive army is able to properly and timely respond to any type of changes. It denies the 'one size fits all' approach to develop one solution for different circumstances – it rather acknowledges and supports its organisational capabilities in such a way that they allow it to stay effective in any conditions.

✓ An adaptive army recognises the *importance of real-life experience* as a source of valuable feedback that allows an army to test its adaptability. In a case when there is no real-life feedback, the following is taken into account:

- From a theoretical perspective, an army still can maintain an appropriate level of adaptability through the continuous testing of its capabilities in a range of simulated environments, however: (i) in reality it is not possible to replicate war in training, and (ii) any attempts to maintain an adequate level of preparedness should be conducted with appropriate leadership commitment to support and resource this process.

5.4. Limitations

There are a number of limitations of the research findings:

1. Theoretical generalisations are limited by the fact that our research covered one particular army without having an opportunity to compare and contrast results with other militaries.

2. There is only one known documented case of applying the model of organisational adaptability that is based on CFA and described in chapter 2. Thus, the current view is limited to insights gained during the research.

5.5. Further research directions

There are a number of further research directions:

1. CAS theory: a further investigation into the socio-cultural aspects of complex adaptive systems theory is needed.

2. The applicability of the model of organisational adaptability that is based on CFA: aspects of leadership and organisational culture should be tested to improve the applicability of CFA to real-life organisations and other militaries in particular. It should be possible to further test the applicability of CFA in business organisations.

3. The applicability of the model of organisational adaptability that is based on CFA: in spite of these obvious limitations, it is still useful to return to the model of organisational adaptability explained in chapter 2, which blends the theory-building of CFA with my own thinking on this subject. It is, of course, a general model and would require further work of an empirical and theoretical kind to test its applicability in real terms. It should be noted that there were early workings of this model that were presented to the research unit in the DST Group. Their view was that the model was too complicated for implementation. However, I continued to develop my thinking. The second version was tested through applying the model to the ALN review that demonstrated that the model was too rigid. Thus, the current view of the model represents the final state that incorporated all comments being provided before. What follows, therefore, is an outline of research ideas to chart a future direction:

- The adaptive cycle: further work should be done to check and possibly test characteristics of adaptation (learning cycle). It could be beneficial to conduct a deeper level of analysis of literature on organisational learning to develop stronger links between areas of the model of this adaptive cycle and similar learning cycles.

- Scales of adaptation: this thesis covers two different scales (organisational and team) at which the model of organisational adaptability has been applied. However, further work should be done to test the applicability of the model on an individual scale as well as identify ways to link different scales of adaptation together. In contrast to the classical theories of organisational learning, the application of CFA aims to understand this organisational-level of adaptability. This means by acknowledging the importance of employees and their ability to influence organisation and its change, it is necessary to link various organisational scales (individual, team and organisational) together. This will lead to an appraisal of a number of adaptive cycles in a range of organisational scales and their mutual interconnectedness. Starting from a top organisational scale it is suggested to work down through unit and team to a bottom organisational scale presented by individuals. We believe that this will give a more general picture of organisational adaptability showing the way the organisation operates from top to bottom and vice versa.

- Levels and classes of adaptation represent the biggest direction for future research. It was a significant discovery to understand how classes and levels of adaptation relate to each other. Thus, a crucial point is to develop a means to appraise them as 25 dimensional tools (5 classes by 5 levels of adaptation) that helps to measure the overall state of organisational adaptability.

- Practical application of CFA. The conceptual description of organisational adaptation provided by the CFA is a highly abstract concept.

However, it is a comprehensive framework that helps to link ideas of biological adaptation to the processes of organisational adaptation; it provides a 'complexity' perspective to think about and measure organisational change. Thus, the main challenge for future research is to find a way to practically apply the ideas of the CFA. Below we provide a suggestion for a general approach to applying CFA in real life organisations:

Step 1. Create a general description of the system. This step is not limited by a particular model or framework; any model suitable for a particular case can be chosen. The IBM business model component is an example of models that can be used to describe a system (*Component Business Models: Making Specialization Real* 2005). There are five dimensions of the IBM business component: business purpose, activities, resources, governance and business services. A further step can be taken to adjust the existing models to suit the research goals, e.g. extra dimensions can be added and general rearrangement of dimensions can be made (external influence, the process and limitations). Each category has own dimensions, which all together give a general description of the system (Figure 43): (i) external influence: context and external decision-making authority; (ii) the process: business processes, structure, proxies, governance and business services; (iii) limitations: resources and regulations.

Note: the IBM business component is not necessarily a recommendation of this research. It represents an example of a tool that can be utilised. There are other approaches that could be more appropriate in particular circumstances, e.g. Business Process Modelling (BPM).

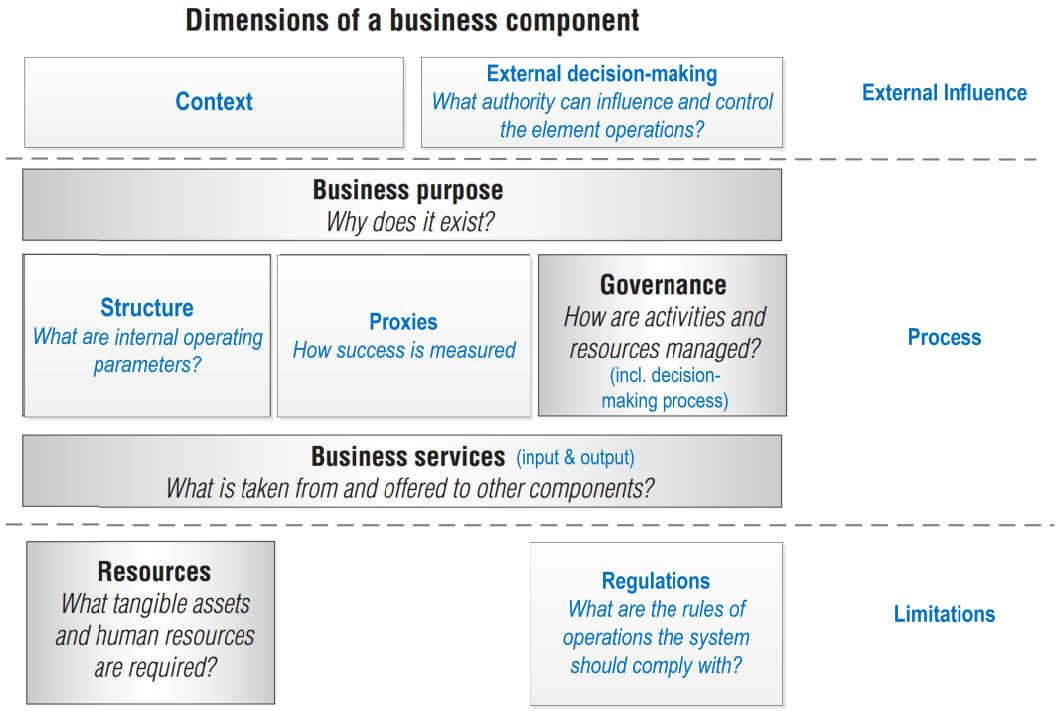

Figure 43. IBM business model

(modified from (Component Business Models: Making Specialization Real 2005))

Step 2. Identify the parameters a system operates within and their mutual influence (interconnectedness of parts).

Step 3. Create and compare system diagrams: *designed* and *as-is* views. Note: a comparison of a system diagram can initiate a gap analysis, which will possibly lead to the deeper analysis of system's parts. Systems diagrams should be developed, using the structure of the learning cycle defined in the previous section. There are two perspectives:

(i) *The designed view*: i.e. description of the functional workings of the system based on the formal documentation; the diagrams describe the business processes, products and information flows between the relevant parts of the network; by explicitly documenting system diagrams we avoid any misinterpretations or misunderstandings when analysing and communicating the system processes.

(ii) *The as-is view*: i.e. how the system functions in reality. Stakeholders and operators are then interviewed to obtain feedback on how the system functions in practice.

The *designed* and *as-is* views should be compared to each other and implementation/institutionalisation weaknesses in the existing processes identified; for example, the processes directed by upper management but which are not followed up, communication links that are broken, etc. The designed and *as-is* views should be then compared with the theoretical model to provide insights into system deficiencies in terms of the key attributes of organisational adaptability; for example, an absence of defining expectations and monitoring implementation outcomes (i.e. ineffective feedback), retrospective data analysis, etc.

Step 4. Evaluate the adaptive properties of the system.

Step 5. Connection between organisational scales. The application of CFA starts from the top organisational scale, where the main goal is to create a general understanding of the system, its conditions of operations and ways of its behaviour. It is not a trivial task, but general patterns of adaptive properties can be identifies here as well. A depth analysis of the system at medium and bottom organisational scales will extend the understanding of organisational adaptability.

There are two options to switch the analysis to medium organisational scale. The *first* one is to appraise the adaptive properties the whole organisational structure. For this the top scale description of the organisation will be a basis to determine the main functions the organisation performs. Then the analysis will focus on each function and will lead to the identification of adaptive cycles for every function and interconnections of those cycles. The analysis of the whole organisation is possible for small enough organisation, the size

and structure of which are feasible to be analysed. For big organisations we offer the *second* options. It deals with some parts/areas of the organisation at a time. It is suggested that through stakeholder engagement and/or the analysis of the *designed* and *as-is* views, a researcher identifies the most critical areas for review. The identified critical areas will be analysed at medium and bottom organisational scales that will be linked together. The next cycle of analysis will focus in other areas being identified as critical. Over time it will be possible to build a full picture of adaptive cycles (map or network) in the whole organisation, i.e. build *adaptive architecture*.

The connection between the medium and bottom scales is not as difficult as linking strategic level to operational one. The analysis of critical areas at the medium scale will logically lead to interactions with individuals who can share their work experience providing insights into organisational adaptability at the bottom organisational scale.

Note: the above guidance is general propositions for applying the CFA to a particular practical case of organisational change. Therefore, we deliberately do not limit future researchers to the tools to be utilised to conduct processes analyses of the organisation under review.

4. Understanding adaptability of an army: a further clarification of characteristics of an adaptive army is needed.

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Appendices

5.6. Appendix A. Ethics approvals

THE UNIVERSITY of ADELAIDE

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School: Entrepreneurship, Commercialisation and Innovation Centre

Project Title: An alternative approach to identifying and appraising adaptive mechanisms in complex organisations

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The University of Adelaide Human Research Ethics Committee
Low Risk Human Research Ethics Review Group (Faculty of Humanities and Social Sciences and Faculty of the Professions)

ETHICS APPROVAL No: H-2014-211 **App. No.: 0000019147**

APPROVED for the period: 25 Sep 2014 to 30 Sep 2017

Thank you for your responses dated 20.08.14, 26.08.14, 19.09.14 and 22.09.14 to the matters raised.

This study is to be undertaken by Ms Amina Omarova, PhD student.

PROFESSOR RACHEL A. ANKENY
Co-Convenor
Low Risk Human Research Ethics Review Group (Faculty of Humanities and Social Sciences and Faculty of the Professions)

ASSOCIATE PROFESSOR PAUL BABIE
Co-Convenor
Low Risk Human Research Ethics Review Group (Faculty of Humanities and Social Sciences and Faculty of the Professions)

DSTO Ethics Application to conduct Low-Risk Human Research

Project Title	**Review of Adaptive Army initiatives: Key Stakeholder Interviews**		
Division	Joint and Operations Analysis Division / Land Division	Task number:	ARM 07/415
Date of Submission	13/06/2014	Duration of approval sought (up to 3 years)	2 years

Investigators

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Description of project (background, aims, method, analysis: maximum 1000 words)

Background. In 2008 Army commenced on an ambitious program, the Adaptive Army initiative (AAI), of putting its entire organisation on an adaptive footing, resulting in over 40 separate initiatives over the following 12 months "to ensure it remains fit for a changing environment" [Ref 1-2]. More than five years on from the commencement of AAI implementation, we are interested in analysing how well the AAI has met its original goals and more generally to investigate the views of Senior Officers on how adaptive Army is today. We are also interested in gaining insights into the events that led to the initiation of the AAI, its conceptualisation and any issues that arose during its roll-out.

Aims. Interview Army Officers that were involved with the conceptualisation and implementation of the AAI and gain their insights from their experiences regarding: (i) Design of the AAI, (ii) Implementation of the AAI, (iii) Achievements and Outcomes of the AAI, (iv) Theoretical Underpinnings of the AAI, and (v) Current level of Army's organisational adaptability.

Methodology. The original documentation that underpinned the AAI has been reviewed and informed interview questions. Interviews have been targeted at those Army Officers who were intimately involved in the conceptualisation, design and implementation of the AAI, with participation voluntary. Interviews will be semi-structured and will be of 60 minutes duration. Questions will be provided to interviewees approximately one week prior to the scheduled interview and notes from the interview provided for comment within one week of the interview being completed. Any comments made during the interview will only be attributed with permission from the interviewee.

Analysis. Interview records will be analysed for key themes and simple frequency analysis of the number of times a key issue was raised during the interviews, to provide an indication of the importance of themes/issues.

Expected Outcomes. The key outcomes will be a consolidated report detailing key insights into: (i) the quality of the design of the AAI including the definition of goals, (ii) the monitoring and level of achievement of goals, (iii) influences on the conceptualisation, and (iv) views on what makes organisation adaptive and whether the Australian Army is highly adaptive.

References

1. CA Directive 22/08 "Adaptive Army: The evolution of Army's Higher C2 Structures"
2. CA Directive 14/09 "Implementing the Adaptive Army in 2009"

Participants (refer to *National Statement* section 4)

From where do you intend to source participants?
Participants have been targeted based upon advice from DGSP-A as to the key Officers involved with the initiation and implementation of the AAI: participation is completely voluntary.

Y☒ N☐ Are you selecting participants from a particular group (e.g., male, ADF)?

Y☐ N☒ Will participants be paid or otherwise induced to participate?

Y☐ N☒ Will participants have any relationship (e.g., subordinate) with the researchers?

Y☐ N☒ Does the research specifically target any of the following participant groups: pregnant women, children, people in unequal relationships, people with cognitive impairment, people who are not able to give consent, people involved in illegal activities, Aboriginal or Torres Strait islanders, or people from another country?

If YES to any of the above, describe the requirement and management of associated ethical issues.
Selected participants based on those Officers most involved in the AAI; hence Officers not intimately involved will be excluded.

Informed consent (refer to *National Statement* chapters 2.2, 2.3)

Y☒ N☐ Will you seek informed consent from participants? [If NO, describe the reasons why.]
N/A

Y☐ N☒ Is there a need to deceive participants?

Y☐ N☒ Will the research require covert observation?

If YES to either of the above, describe the reasons and debriefing process.

N/A

Risks and benefits (refer to *National Statement* chapter 2.1)

Y☐ N☒ Is there potential for physical or psychological discomfort of participants?

Y☐ N☒ Is there potential for physical or psychological harm to participants?

Y☐ N☒ Does the research address any topics that the participants might consider sensitive (e.g., grief, illegal activity, gender identity)

Y☐ N☒ Are there any risks to researchers? [If YES please attach the DSTO safety case]

How will the research be monitored for adverse affects?

The research is not expected to cause any adverse effects or indeed any discomfort to participants. Participation is completely voluntary, as is answering any individual question.

What services will be provided to any participants who are adversely affected by the research?

Contact details will be provided to counselling services if requested.

Who will benefit from the research and how will the benefits occur? (*Specifically address benefits to Defence*)

Provide Army's insights to the AAI and how the initiatives can be refined and perhaps expanded, as well as the processes that lead to their initiation, monitoring and review; leading to improvements into Army's level of organizational adaptability. Input into institutional lessons study currently underway in AHQ.

Describe all risks, their likelihood and mitigation.

Risks: The risks associated with the study are extremely low. There are no foreseeable risks to the researchers in this project.

Likelihood: The likelihood of discomfort is very low, as all participants will be accustomed to taking part in interviews and the questions being asked are directly relevant to the participants' job history and are of key interest to the participants.

Mitigation: The risk of discomfort will be mitigated by keeping the interviews brief (less than 60 mins) and relevant to their participant's knowledge and area of expertise, which should keep them engaged in the study. Participants will be reassured that, should they so desire it, their comments and identity will remain anonymous in any reports arising from the project.

Research methods (refer to *National Statement* section 3)

Y☒ N☐ Will the research use qualitative methods (interviews, focus groups etc.)?

Y☐ N☒ Will the research collect information for or from databanks?

Y☐ N☒ Will the research trial new clinical or non-clinical interventions or therapies?

Y☐ N☒ Will the research use tissue samples, genetics, or stem cells?

If YES to any of the above, describe the requirement and management of associated ethical issues

Interviews will be used as the data collection method for this study. The following procedures will be adopted to ensure the study is conducted IAW ethical guidelines for qualitative research in the National Statement:

- **Research Merit and Integrity**: Individuals selected have been targeted due to their high level and relevant experience. The researchers have significant expertise in conducting interviews and qualitative analysis.
- **Justice**: Inclusion of participants is voluntary and based on the participant's previous role.
- **Beneficence**: Care will be taken in storing and reporting the information to ensure the anonymity of participants is maintained, dependent on their wishes. All interviews will be unclassified.
- **Respect**: Participants will be given the opportunity to examine the interview transcripts for completeness and accuracy before data analysis is completed and within one week of the interview being conducted.

Privacy and confidentiality

Y☐ N☒ Will researchers have access to identifiable or potentially identifiable records not normally available to them?

Y☐ N☒ Is it possible that participants may be identified or that their data may be divulged without their consent during or after the research?

Y☐ N☒ Will it be necessary to make audio or video recordings of participants?

If YES to any of the above, describe how privacy will be ensured.

N/A

How will data be stored?

Interview records and notes will be stored in researcher's offices in locked cabinets, electronic notes and analysis will be stored in a password protected folder.

Conflicts of interest (refer to *National Statement* chapter 5.4)

Y☐ N☒ Is the research being funded outside of DSTO?

Y☐ N☒ Is the research being funded outside of Defence?

Y☐ N☒ Are there potential conflicts of interest (personal, professional, financial)?

If YES to any of the above, describe and include any relevant documentation.

N/A

Other approvals

Y☒ N☐ Are other organisations involved in the research?

Y☐ N☒ Has this research previously been submitted to or approved by another Human Research Ethics review body?

If YES to either of the above, please provide details.

University of Adelaide (PhD student and Senior Postdoctoral Researcher) – Research Agreement in place.
An ethics submission has also been made through the University of Adelaide.

Checklist *(materials to be included with this form)*

☒	Attached	Participant Information Sheet
☒	Attached	Participant Consent Form
☒	Attached	Guidelines for Volunteers
☒	Attached	Questionnaire and other materials (attached)

Resource Requirements *(estimate)*

DSTO	1
ADF	
Other (specify)	2 (Adel. Uni.)
Participants	25 (approx)

Declaration of lead investigator

If approved, I/we will conduct this research in accordance with this application, the *National Statement on Ethical Conduct of Human Research*, Defence Health Manual 23, and relevant privacy legislation. I will immediately advise the approving panel of any adverse outcomes from the research and will submit an annual report of progress to the approving panel.

Full Name	Signature	Date
Dr Matthew Richmond		13/06/2014

~~Endorsement~~/Approval of Chief of Division or their delegate (Please select one of the following options)

Approval: I confirm that the research proposal **does not have foreseeable potential for infringement of the ethical principles** defined in the *National Statement*. I also confirm that this research meets a Defence requirement, employs sound scientific methodology and estimated resources are appropriate. I will keep a record of approved proposals and will forward a copy to the DSTO Ethics Review Panel for information. I will monitor the research to ensure that these ethical principles are adhered to.

Full Name	Signature	Date
NICHOLAS BEAGLEY		17/6/14

Endorsement: I confirm that this research proposal **does ~~have~~ foreseeable potential for infringement of the ethical principles** defined in the *National Statement* and therefore requires review by the DSTO Human Sciences Ethics Panel. I also confirm that this research meets a Defence requirement, employs sound scientific methodology and estimated resources are appropriate.

Full Name	Signature	Date

DSTO Ethics Review Panel use only

Approval of DSTO low-risk human research ethics panel

Full Name	Signature	Date

Summary of discussion

Australian Government
Department of Defence
Defence Science and Technology Organisation

Minute

ARM 13/0021
RL-A/OUT/08042014

DGSP-A BRIG Mick Ryan

ADAPATIVE ARMY INITIATIVES - INSIGHTS INTO IMPLEMENTATION ISSUES AND IMPACTS: DGSP-A ENDORSEMENT FOR CONDUCT OF TARGETED INTERVIEWS

References:

A. Adaptive Army Initiative Review – Review of Army Lessons Network, 18 Sept 13
B. SP-A/OUT/2013/I3948357 ALAB Review of Army Lessons Network – directed tasks for DSTO
C. SOCOMD Organisational Learning Project TOR, 20 Dec 2013

1. DSTO, in collaboration with Adelaide University, have been reviewing Army's organisational-level adaptability. These reviews are focussing on two key aspects of the Adaptive Army Initiatives (AAI); the Army Lessons Network (ALN) and the Army Training and Education (T&E) system.

2. The first phase of the ALN review is complete; recommendations for improvements to the ALN were briefed to the ALAB in September 2013 (Ref A). The second phase of the ALN review is in progress; it will culminate with a Draft DI(A) Army Lessons (Ref B, update ALAB 01/14) and a review of SOCOMD lessons processes (which is in conjunction with a DSOT request, Ref C, completion date 30 Nov 2014).

3. In the course of conducting the review of the ALN, it became apparent that it would be useful to interview senior Army Officers involved in the conception, design and implementation of the AAI, or who were in charge of the areas of Army most impacted by the AAI. The interviews will:

a. Contextualise the events that led to the AAI and during its roll-out; and
b. Provide insights that can be compared and contrasted with the results from the reviews of the ALN and T&E system.

4. At this point we are seeking DGSP-A endorsement to conduct these interviews. A proposed list of interviewees is provided in Annex A; however, we welcome your recommendations.

5. The interviews will be semi-structured in order to gain insight into the interviewees' perceptions and experiences of the AAI, and will cover the following areas (in relation in AAI):

a. Interviewees' role;
b. high-level aims;
c. vision;
d. driving forces that underpinned decisions;

e. implementation issues;
f. expected improvements;
g. maintaining / refining the AAI;
h. understanding and operationalisation of adaptability concepts; and
i. impacts of the AAI on Army's ability to deal with change.

6. The interviews will be conducted from two perspectives; exploring, (i) an overview of the AAI from a "big picture" viewpoint and (ii) the specific experiences of the interviewee. A summary of the interview will be recorded and provided to the interviewee, along with any questions of clarification, for their confirmation, refinement and comment.

7. Note that this activity will be unclassified, of no cost to Army, and that we are very flexible with scheduling.

8. The outcomes of the interviews will be briefed back to DGSP-A; however, no publication of results will occur without prior approval from DGSP-A.

Dr Anne-Marie Grisogono
RL-A, DSTO-Edinburgh, SA 5111
Tel: 08 73896532; Mob: 0409076684. Email: anne-marie.grisogono@dsto.defence.gov.au

08 April 14

Annex: Proposed List of Interviewees:

Serving Army Personnel:
1. LTGEN David Morrison
2. LTGEN Brian Power
3. MAJGEN John Caligari
4. MAJGEN Simone Wilkie
5. BRIG Mick Ryan
6. BRIG Mick Moon
7. BRIG Chris Field
8. BRIG Greg Bilton
9. BRIG Peter Clay
10. COL Mick Tucker
11. LTCOL Anita Rynne

Retired Army personnel:
12. LTGEN Peter Leahy
13. LTGEN Ken Gillespie
14. MAJGEN Paul Simon
15. MAJGEN Mark Kelly

5.7. Appendix B. AAI Interview questions

Adaptive Army initiative (AAI) – Key Stakeholder Interviews: info sheet

Interview Introduction

First, our sincere thanks for your willingness to be involved with this study. We are exploring how the Army as a complex organisation, given its multiple functions and levels of command and control, actively manages its adaptation to a continuously changing environment from a theoretical perspective. Our focus is on the operational aspects (process, structures and roles) that make an organisation adaptable to changing conditions. We want to tap into your knowledge and experience of the AAI and explore issues related to organisational performance and effectiveness.

Interview Background

In 2008 Army commenced on an ambitious program, the Adaptive Army initiative (AAI), of putting its entire organisation on an adaptive footing, resulting in over 40 separate initiatives over the following 12 months "to ensure it remains fit for a changing environment". More than five years on from the implementation of the AAI, we are interested in your opinions on how well the AAI has met its original goals and more generally how adaptive Army is today. We are also interested in gaining insights into the events that led to the initiation of the AAI, its conceptualisation and any issues during its roll-out

Interview Structure

The interview is semi-structured and organised around five main areas: interviewee's background, design of the AAI, implementation of the AAI, impact of the AAI and theoretical underpinnings of the AAI. Every section contains two types of questions – main and follow-up questions. A written

summary of the interview will be provided for your confirmation. Also, with your consent, some follow-up questions of clarification may be provided to you.

Background Questions

We are interested in discussing some of your background, especially how it relates to your involvement with the AAI. This information will provide context to the rest of the interview.

Main questions:

1. Were you involved in the original design and implementation of the AAI?
2. What role did you play? Over what period?

Follow-up questions:

3. How did you become involved?
4. Is there anything further you can tell us about your involvement in the early stages of the AAI?

Design of the AAI

The AAI comprise several goals all intended to achieve a 'fit for purpose' outcome:

- Improve Army's alignment with, and capacity to inform, ADF's strategic and operational joint planning.
- Better execute force generation and preparation, in a manner that balances operational commitments and contingency planning.
- Increase the effectiveness and efficiency of training within Army through the development of the integrated Army Training Continuum.
- Improve the linkage between resource inputs, collective training outputs and Army modernisation within Army's force generation and preparation continuum.
- Improve the quality and timeliness of information flows throughout Army in order to enhance Army's adaptation mechanisms at all levels.
- Improve Army's ability to deliver Warfighting concepts, future force options, learning products and capability development options, to enhance today's Army and shape the future joint land force.

- And finally, reduce the cost of ownership of materiel and minimise equipment holdings within units in favour of more robust training and maintenance pools.

Main questions:

1. How effectively did the goals represent the overall vision for the AAI? Did some goals do this more or less effectively than others?
2. Were some goals more important than others and did they adequately describe your expectations of what could be achieved through the AAI?

Follow-up questions:

3. Looking back on the original goals for the AAI, did you hold any views about them at the time?
4. How have your views about the goals of the AAI and expectations of the AAI more generally changed over time, if at all?
5. Do you have any other comments about the original design and goals of the AAI?

Implementation of the AAI

Main questions:

1. With the benefit of hindsight, did anything hinder the roll-out and implementation of the AAI?
2. Are you aware of any initiatives that fell away? If so, why?

Follow-up questions:

3. If some planned initiatives were not implemented effectively, when did it become clear that there were issues with their roll-out? Were they anticipated? What were the causes? Were attempts made to overcome them? If not, why not?
4. Is there anything else you would like to add about the roll-out and implementation of the AAI?

Achievements and outcomes of the AAI

Main questions:

1. Looking back, what is your view of AAI achievements to date?
2. How were these achievements monitored?

Follow-up questions:

3. What impact has the AAI had on Army adaptability? Please provide examples of where Army is and is not adaptable.

4. What is your view of the AAI today? How has it been adjusted since 2008?
5. In particular, has the AAI made a significant contribution to Army's capability in dealing with complex military situations (including during recent operations)?

Theoretical underpinnings of the AAI

Main questions:

1. From your knowledge and experience, what are the main issues that impact on an organisations' ability to adapt to change (and especially to complex change)?
2. What do you think holds some military organisations back from being flexible and responsive to complex events and situations?

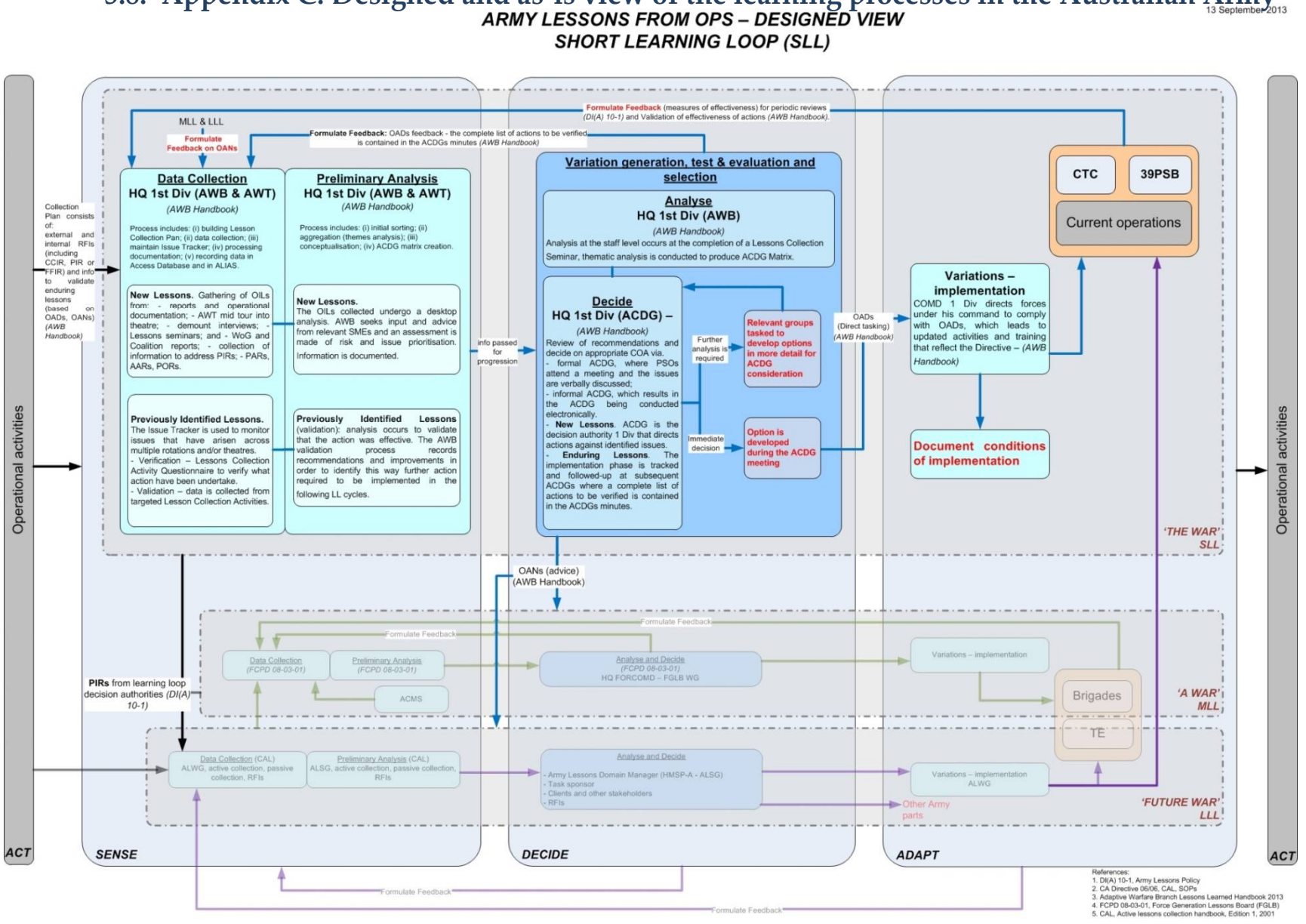
Follow-up questions:

3. In thinking about the conception of the AAI, what ideas most inspired and motivated the team responsible for its design?
4. Where were they drawn from (e.g. military sources, academic literature, business organisational models etc.)?

Finally

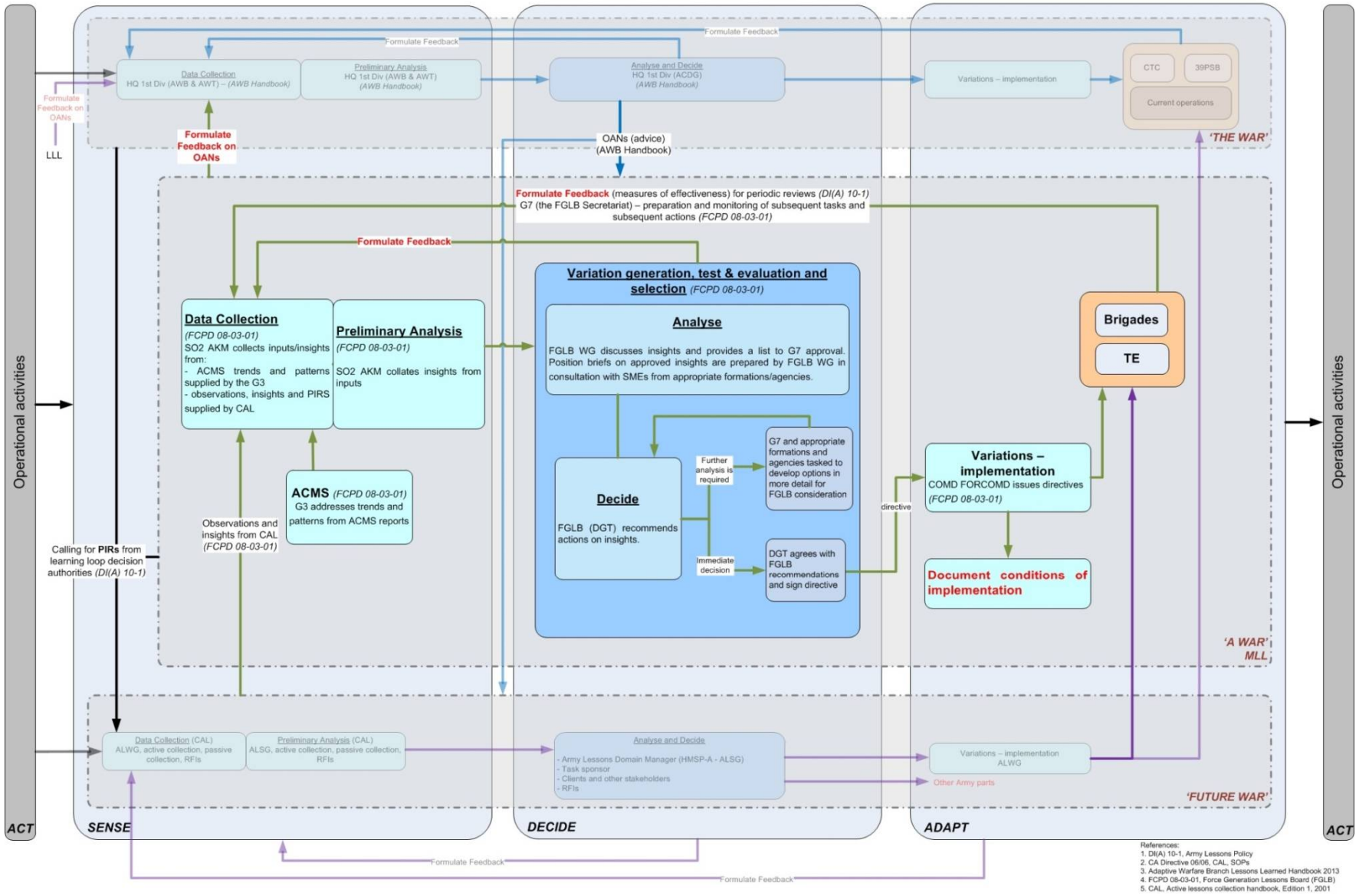
If you were to start another AAI, would you approach it differently?

5.8. Appendix C. Designed and as-is view of the learning processes in the Australian Army



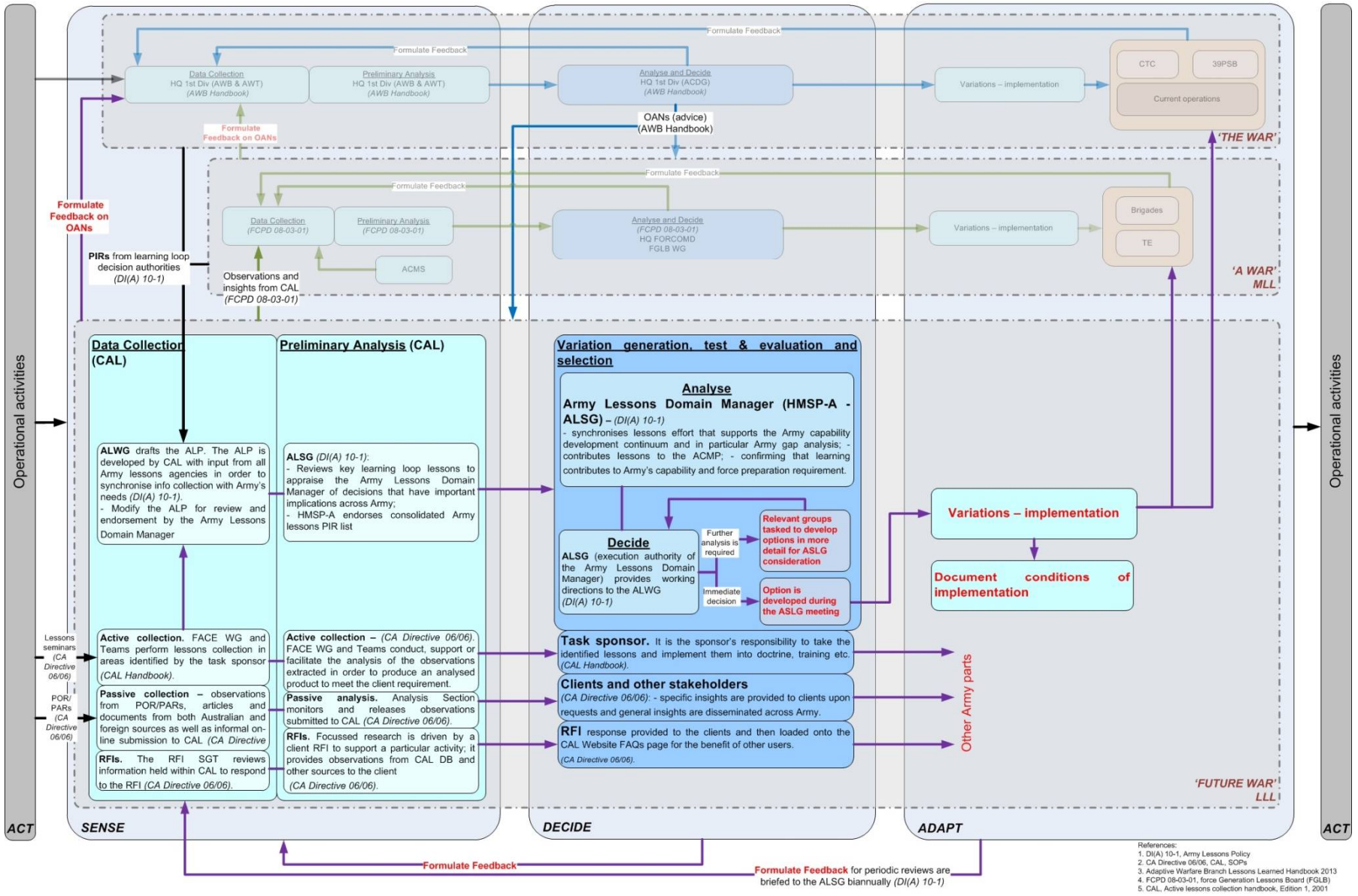
13 September 2013

ARMY LESSONS FROM OPS – DESIGNED VIEW
MEDIUM LEARNING LOOP (MLL)



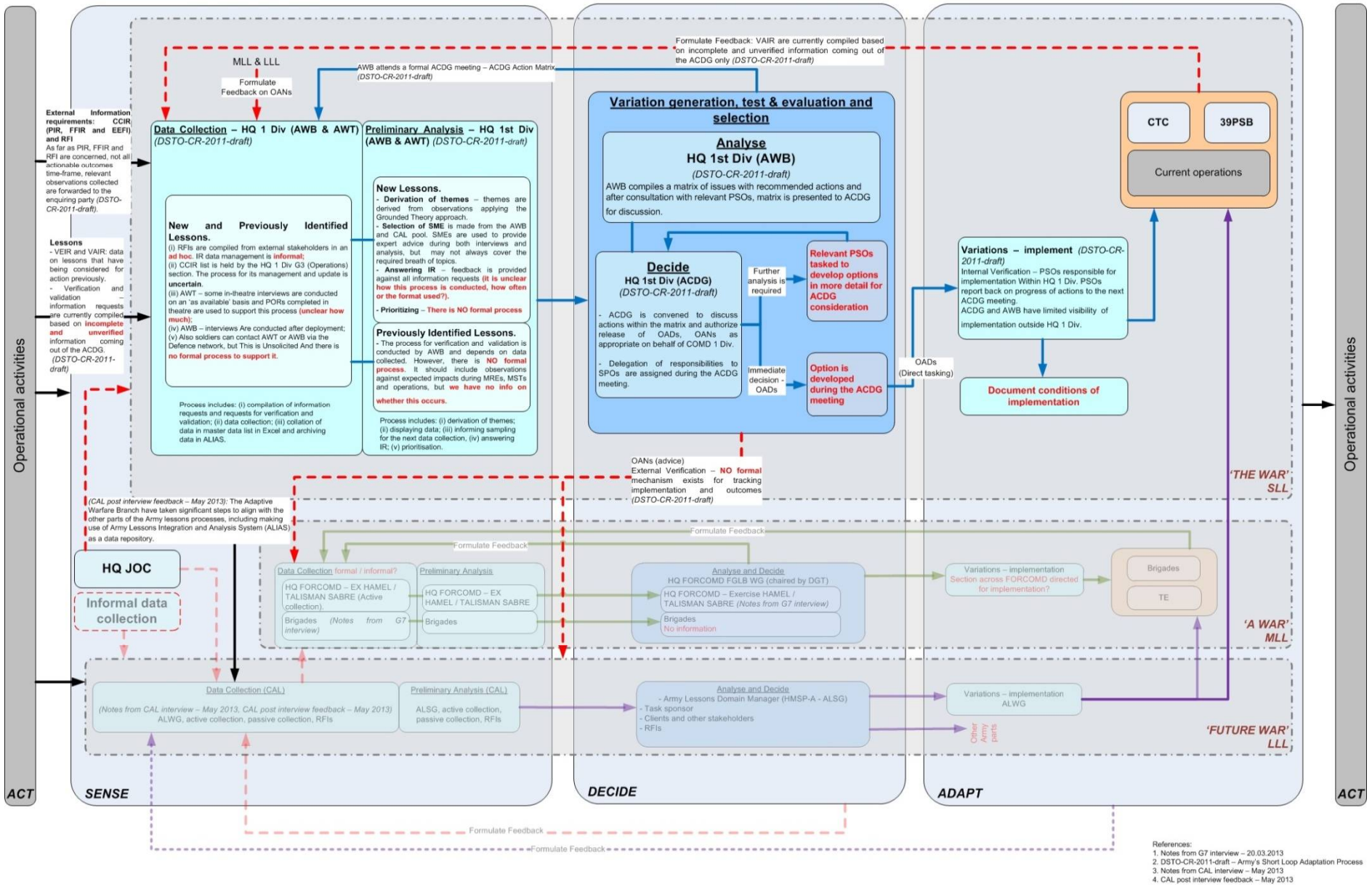
13 September 2013

ARMY LESSONS FROM OPS – DESIGNED VIEW
LONG LEARNING LOOP (LLL)



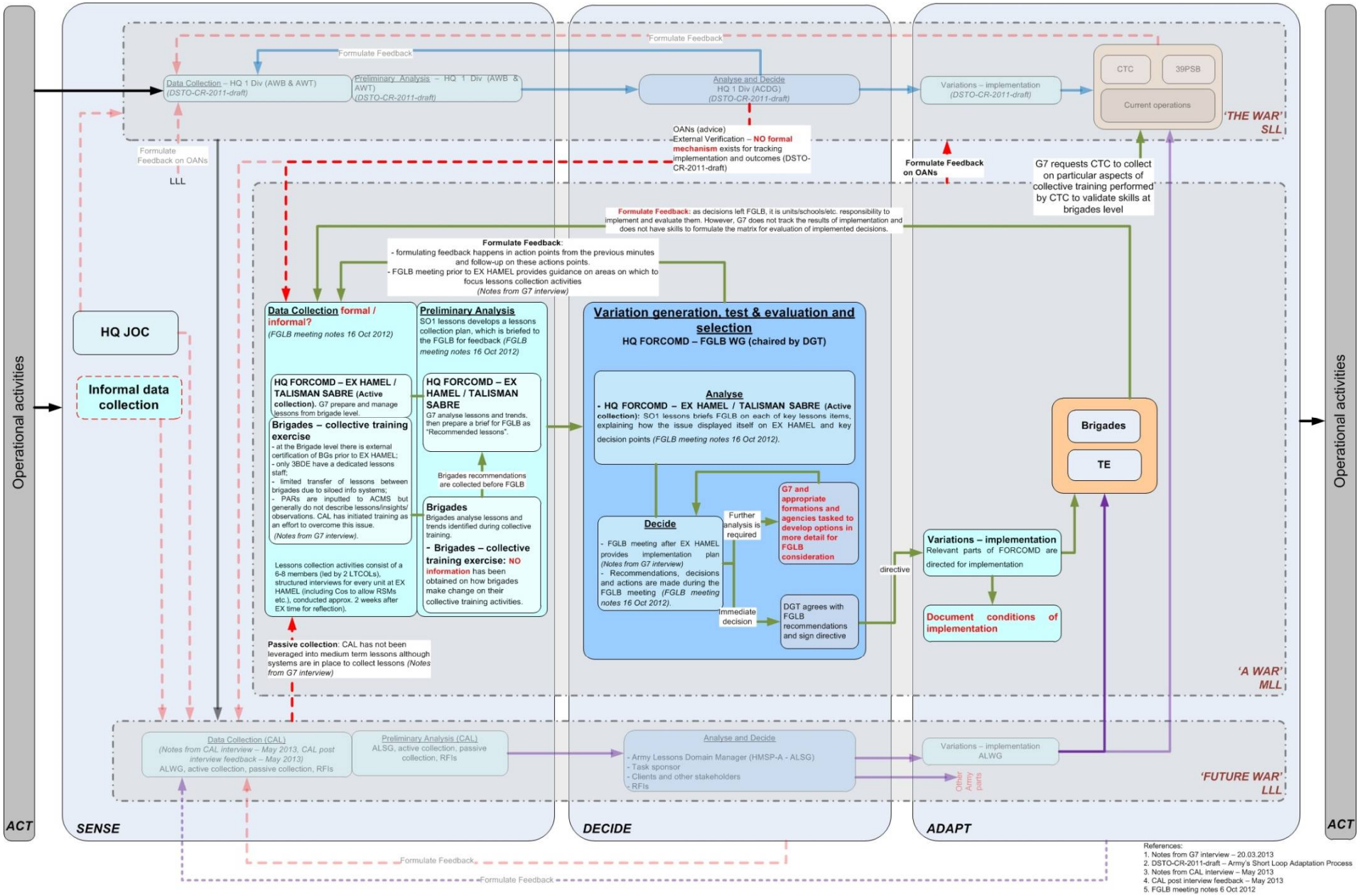
13 September 2013

ARMY LESSONS FROM OPS – AS-IS VIEW
SHORT LEARNING LOOP (SLL)



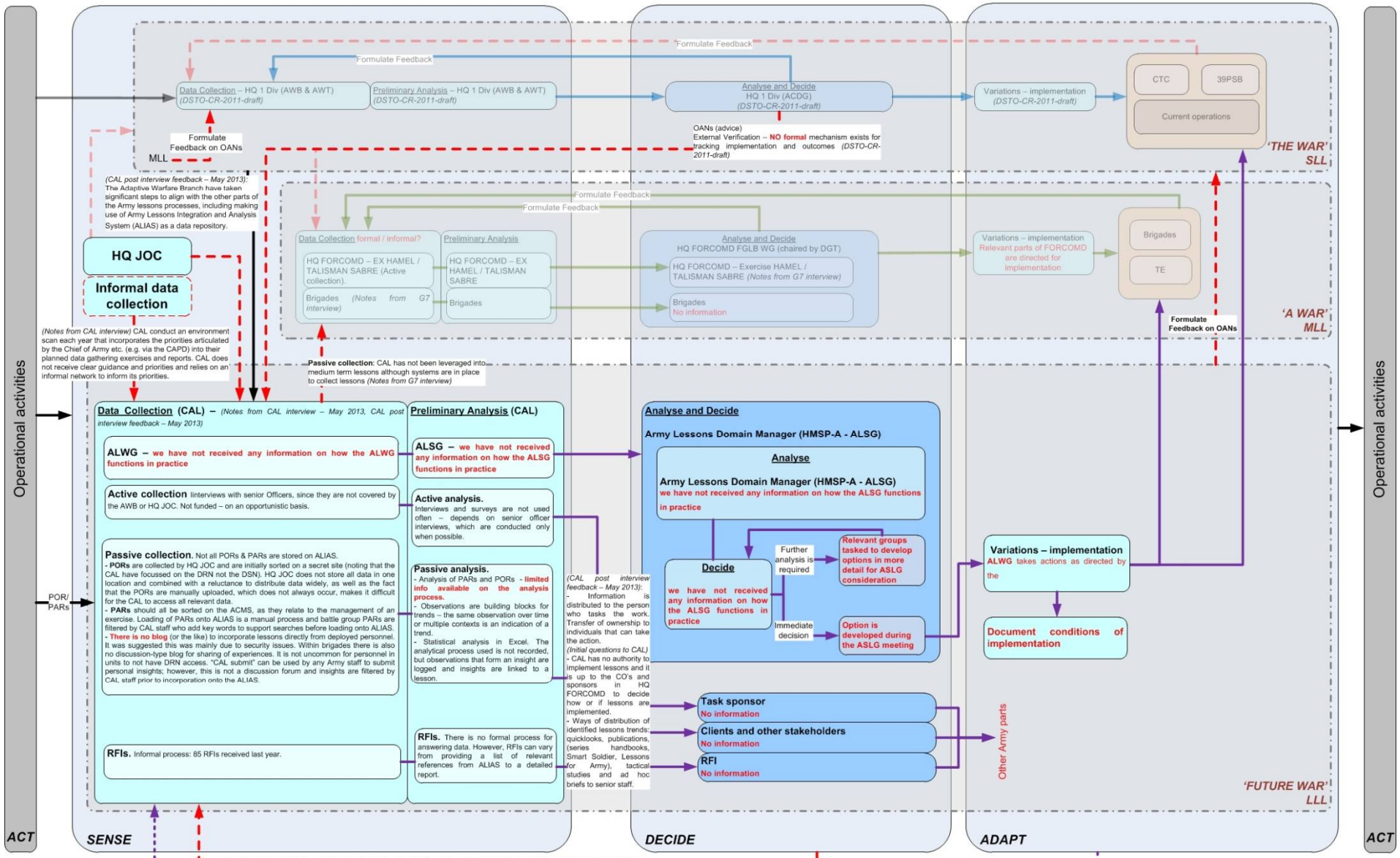
References:
1. Notes from G7 interview – 20.03.2013
2. DSTO-CR-2011-draft – Army's Short Loop Adaptation Process
3. Notes from CAL interview – May 2013
4. CAL post interview feedback – May 2013

ARMY LESSONS FROM OPS – AS-IS VIEW
MEDIUM LEARNING LOOP (MLL)



13 September 2013

ARMY LESSONS FROM OPS – AS-IS VIEW
LONG LEARNING LOOP (LLL)



5.9. Appendix D. Results of SWOT workshops

Stakeholder Input

The next step of the analysis focused on obtaining Army staff inputs (from CAL, G7 and HQ 1 Div) on learning processes, where gaps highlighted in the first step were used to initiate discussion. Two SWOT workshops were conducted in August 2013: the first workshop involved five CAL staff in Puckapunyal and the second workshop three G7 staff in Victoria Barracks. Input was also sought from HQ 1 Div and was released to us in September 2013. Input was also sought in regards to the interaction of the ALN with capability development processes, and interviews were conducted with DST Group staff involved with Diggerworks and the Senior Military Officer embedded in DST Group (Land Division) who sits on the Land Capability Battle-worthiness Board (LCBB).

CAL SWOT Workshop

Strengths:

- **S1.** Highly developed Data Repository & Analysis: Huge volume of high quality held by CAL. Access to CAL data base is widely available to Defence staff including anybody with DRN account, webstats are available to monitor usage, keeping classification at, or below, restricted enhances its utility (demonstrated that even SOCOMD data can be downgraded without losing its utility). ALIAS has moved beyond just a repository, it has a highly developed analysis capability that supports broader areas of research beyond just lessons (e.g. highly applicable to clustering techniques and thematic analysis that enable trend analysis and thread structure assists exploration of themes) and has become Army's pseudo technical library. Critically, ALIAS matches established business processes/procedures making it highly adaptable to other agencies. (S1, S9, S14 & S16)
- **S2.** World recognised staff, products & reputation: CAL maintains significant tacit knowledge and a quality brand. Its use of civilian staff ensures staff continuity and high skill levels, CAL output is highly valued by those who make use of it making it more effective at gaining buy-in than directives, CAL has a solid international reputation (e.g. regular requests

from international community), CAL utilises multiple product formats (e.g. smart soldier, pamphlets, quick looks, briefs etc.) (S2, S3, S8, S10, S15, & S19)

- **S3.** Good engagement with other ALN groups and Training Establishments: Army lessons network is well established and has broad coverage (incl. CTC), CAL has a good working relationship with CTC & AWB and CAL has a broad ability to engage with wider Army including personal relationships that have developed over many years. Well located geographically to liaise into training establishments. (S4, S13 & S17)
- **S4.** Highly developed lessons processes and training packages: CAL maintains significant corporate knowledge and a quality brand. Its use of OILs is a robust model that can adapt to any learning loop or organisations (e.g. AFP), V&V, traceability etc., CAL focus on building insights that are based on observations from multiple contexts provides a robust basis for building lessons. Highly responsive (e.g. to RFIs) due to well established processes and tools, CAL has training & education packages that are mature and highly applicable across broader Army, ADF & AGA's. (S3, S5, S6, S7)
- **S5.** CAL Maintains a High Degree of Flexibility: CAL operates efficiently, even without policy guidance. It's highly experienced staff, well developed informal relationships, established procedures, practices and tools make it a highly flexible/responsive/knowledgeable organisation (S4, S7, S8, & S18).

Weaknesses:

- **W1.** Poor integration into formal DM processes: Lack of experience in lessons beyond Army limits engagement potential and achieving effects. CAL has no formal links into the implementation process and there is no policy for authorising lessons. (W1, W2)
- **W2.** Difficulty in actioning lessons and confirming lessons are learnt: Lack of authority/means to recommend actions & options impacts badly on implementation & accountability. CAL has no formal links into the implementation process and there is no policy for authorising lessons. CAL lacks the capacity to systematically monitor MOE's of lessons outputs and even if they had it is impossible to gain 100% visibility that lessons are applied universally. Even when action is successful, how long before that lesson is forgotten. (W2, W5, W14 & T5)
- **W3.** Poor appreciation of CAL role and lessons in wider Army: No CAL champion, need to educate customers to conduct initial search of ALIAS prior to raising an RFI, poor ability to engage and influence Army esp. to enhance culture and behaviours, manage expectations and improve knowledge of products. (W2 & W7)
- **W4.** CAL lacks focus: CAL has a huge span of responsibility (across all FORCOMD, FORGEN, production, RFI's, multiple FIC, all planning, all decisions, maintaining ALIAS). Although its focus should be on Army's big

issues, it lacks the guidance from senior leaders to fulfil this role. This is exasperated by the cognitive distance from its leadership and this leads to CAL spending a lot of resources developing priorities and second guessing leadership. (W3, W6 & W16)

- **W5.** Cumbersome Bureaucracy: Chain of command inhibits responsiveness, slows & limits learning and leads to a lack of trust in subordinates. (W13)
- **W6.** Incomplete Lessons Data Collection: Defence Archive Policy has led to the destruction of historical POR's/PAR's, post unit rotations contact reports are not readily available, siloed information systems results in poor access to raw data (e.g. AARs). Joint lessons are ad-hoc, not consistent, comprehensive or coherent. (W4, W8 & W12)
- **W7.** CAL processes are not uniformly applied: Lesson processes within Army and other services differ from CAL. Poor synchronisation of lessons across Army, other services, OGA's, allies, etc… has resulted in multiple, exceptionally complicated processes that lack consistency. Each "loop" has a different process. The exceptionally complex process diagrams generated for this study are the result of agencies creating their own processes for each learning loop when they don't need to do so. (W9, W10 & W15)
- **W8.** Reduced relevance of CAL: Often customer expectations don't match reality in terms of what CAL can deliver, customers are always looking for the "silver bullet". Any agency can generate lessons (e.g. ALPC, DST Group, IE-A, ABCA reps etc.) and within Army many do, in fact the exceptionally complex process diagrams of the ALN are the result of multiple agencies. (W11, W15 & W17).

Opportunities:

- **O1.** Limited understanding of the Lessons Process Generates Flexibility in Action: Exploit grey areas & gaps in knowledge/understanding of the capability leading to freedom of manoeuvre and opportunities to work with other services, agencies (joint & WOG) & the wider research community. (O1, O7 & O8)
- **O2.** Integration into HQ FORCOMD: Allows for direct access to units and training schools, better integration of CAL into medium lessons loop incl. lessons from training activities & IIS. An active collection capability is needed to document lessons from collective training activities. Corp's conferences can be used to socialise lessons into communities and harvest PIR's.(O2, O10, O18 & O19)
- **O3.** OP Tempo Reduction: allow time for refocus from ops to other areas (e.g. training/FORGEN/foundation warfighting/knowledge/modernisation decisions/lessons) and time to analyse & develop COA's. (O3)

- **O4.** Integration into Joint & International Lessons Systems: Implementation of a Joint lessons information system (JLLIS) could allow for effective marketing that ensures uptake (buy-in) at all levels, greater influence on the business practices of the other services, joint and even US (in particular CAL use of Insights) and effective sharing of lessons data between ABCA. Outposted LO's can be utilised as inputs (sensors & actors) and CAL can influence their work. (O4, O5 & O8)
- **O5.** Influence Committee Decisions: Organisational decisions can be influenced by lessons, there is an opportunity to synchronise capability in terms of all/each FIC. Decision authorities already exist and there is an opportunity to influence their TORs (to be decisive not just informative). (O6, O12, S11 & S12)
- **O6.** Collaboration with R&D Organisations: Research community is there to be harnessed e.g. AHU, DST Group, DFD-A, academia. (O7)
- **O7.** People see benefits in lessons: Demand for lessons training is high as units want support in improving their lessons capturing capability and conducting evaluation of collective training. The use of KIOSKs in unit messes to both push & pull lessons would reinforce this, taking advantage of new technologies to provide an interactive learning experience (O2, O3, O9, O15 & O21)
- **O8.** Drawing enduring operational lessons into foundation warfighting skills : With 15 years of high tempo operational lessons to document and analyse, the focus should be on CAL who can perform ongoing collection/trend analysis to further qualify & quantify lessons effectiveness and verify lessons implementation. (O3, O14, O16 & O20)
- **O9.** Institutionalising lessons into ATC/ETD: Army is the authority for doctrine, training and trade management and, as such controls the implementation of lessons into ALE (e.g. introduction of blended learning methods). Furthermore, Army has the opportunity to institutionalise lessons processes into planning procedures (e.g. incorporating into the MAP to support overcoming biases). (O11, O13 & O17).

Threats:

- **T1.** Lack of Integration into wider Army: Lack of engagement and a dislocation from CAL staff impacts on CAL guidance/focus, visibility and ability to market their relevance. Could result in CAL placing effort on the wrong tasks. (T1, T3, T12, T14, & W16)
- **T2.** Stove piped structure based on learning loops that inhibits coordination across Army: With no coordinating authority the culture within the ALN is based on Institutionalised boundaries that tightly control information and limit CAL freedom of action. The misuse of learning loops to stovepipe lessons processes could limit organisational learning as the flow of lessons at all levels is subdued. Exceptionally complex process diagrams

as a result of agencies creating their own processes when they don't need to (T2, T9, T10, T15, T16, & W15)

- **T3.** Poor implementation mechanisms and inputs into Decision-Making: Lessons boards that lack purpose, synchronisation and action will be seen as ineffective and undervalued. Lack of authority/means to recommend actions & options limits implementation & accountability. Professional arrogance and poor decision making models prevents lessons from informing decisions. (T5, T6, T11, T13 & T14)
- **T4.** Move to a Joint system and a reduction in Army current capabilities: The expectations of a joint information system may not be realised and in attempts to reduce maintenance/development costs of Army's system the current ALIAS capability may be reduced or lost. Exacerbated by lack of experience in lessons beyond Army. (T7, T17 & W1)
- **T5.** Senior leadership perceptions and a broader lack of understanding of KM & Lessons: Perceptions of senior leadership, a lack of understanding of KM & Lessons in wider Army and a lessons policy that does not seem central to generating effects impact on the perceived value of the ALN. (T3, T4, T18, & T19).

G7 TOWS Workshop

Strengths:

- **S1.** DGT has the resources to implement lessons via doctrine, G7, ET&D and training schools.
- **S2.** FGLB provides a good forum with appropriate membership to make quick decisions for lessons implementation (if well attended).
- **S3.** Close liaison between CAL and G7.
- **S4.** Posting cycle brings in new ideas, reinvigorates area with new perspectives, different focus etc.
- **S5.** Informal communication is strong between SO1s in G7, G5, ET&D, CAL, and CTC etc.

Weaknesses:

- **W1.** Lessons are not discussed on the Grade 2 or 3 courses. If conducted could lead to the benefits: 1. improve training on using data systems (ACMS, ALIAS) and how to write useful lessons and 2. reinforcing the importance of lessons input and utilisation to eventually develop a learning culture.
- **W2.** Lessons roles and responsibilities are not clearly defined, nor appropriately resourced. Delayed or stalled lessons implementation due to cumbersome procedures and chain of command issues that require significant staff effort to navigate.

- **W3.** Project teams do not regularly involve G7 in exercise design to identify objectives upfront which limits lessons documentation.
- **W4.** Data collection not well focussed or aligned with organisational priorities. Commander FOROMD previously provided guidance on the five highest priorities but that has not been updated in the last 12-18 months (?). Priorities are not coordinated - e.g. CTC, CAL and G7 set collection directions independently. Opportunity for DGT to influence priorities for CTC data collection?
- **W5.** Information systems - not everyone has access to ALIAS; SharePoint has restrictive access privileges and there is not a structured, defined process for information control and management.
- **W6.** Lack of awareness of the CAL services / ALIAS database.
- **W7.** Authority to approve OILs for use quickly (e.g. compared with TRADOC).
- **W8.** ACMS PAR capability is poorly utilised leading to undocumented lessons; requires cultural shift to improve both the number and quality of PARs completed.
- **W9.** Posting cycle leading to lessons staff relocating and a significant loss of tacit knowledge.
- **W10.** Lessons implementation is not well tracked with the responsibility for the monitoring the roll-out of actions passed to the groups that have been charged with their implementation. Leads to poor feedback into follow-up data collection and presumably a lack of continuous improvement.

Opportunities:

- **O1.** CAL moving under HQ FORCOMD chain of command will improve communication between G7 and CAL, allow better access for CAL staff to units, and could provide the impetus to redefine the ALN management structures and processes.
- **O2.** Develop a primary interface which provides a single point of access, is user friendly and plugs into other data systems. Allocate the resources (staff effort) required to support it.
- **O3.** Better target reporting of lessons in appropriate formats. Define user requirements for both software systems and reporting formats.
- **O4.** Better integration of lessons network into wider Army, especially in terms of authorities to direct lessons implementation.
- **O5.** Plan Beersheba and the implementation of the 3 like Brigades provides the opportunity to create/update SOPs related to lessons capture and use.
- **O6.** Better leverage CTC e.g. annual trends report, lessons from MREs and increasingly foundation warfighting training; reinvigorate CTC involvement in the FGLB.

- **O7.** To improve input into G5 and more specifically force development planning.
- **O8.** As Op Tempo reduces, draw more general lessons, e.g. out of foundation warfighting activities now that CTC will move away from conducting MREs and on the utility of planning software systems.

Threats:

- **T1.** Lessons loops are not clearly defined and there is not a clear understanding of what types of lessons are included in each loop. Further, the C2 structures responsible for each of the theoretical loops in practice deal with lessons over wide ranging timescales complicating roles and responsibilities.
- **T2.** Poor coordination across the ALN due to the absence of Army-wide processes and well-defined C2 structures / decision authorities for lessons management ("lack of a one-stop shop for lessons")
- **T3.** Geographically and organisationally distributed lessons staff across the ALN could lead to sub-critical mass lessons capability.
- **T4.** Centralisation of lessons capabilities under DGT could lead to a narrowing of the focus to force generation, to the detriment of strategic lessons (e.g. modernisation).
- **T5.** Management of the lessons network delegated to a rank level which does not have the appropriate authority leading to difficulties in resourcing and integration.
- **T6.** Lack of resourcing to code all lessons data and to conduct trend analysis; this leads to personnel having to examine large amounts of information to locate transferrable lessons.
- **T7.** Implementation of lessons within units can occur in an uncoordinated, informal way without sharing information within the ALN information systems.

AWB Input

Strengths:

- **S1.** Existence and evolution of an ALN. The key strength within the Army Learning Environment is the presence of an evolved and functioning lessons network. Opportunities exist to strengthen the network; however the existence of an adaptive lessons network in itself is cause for acknowledgment.
- **S2.** Evolved, mature data collection methods. The ALN has a number of evolved, mature and validated data collection methods available for use to capture Observations, Insights and Lessons (OILs). These methods include:

    - Lesson Collection Interviews during and post deployment;
    - Post Activity Report and Post Operation Report OIL extraction;
    - Lesson capture during Exercises;
    - Combat Training Centre Observer Trainer observations;
    - Coalition document capture; and
    - Formal and informal information exchange with ABCA and coalition partners.

- **S3.** Deployed Learning Capability. AWB rapidly collects, exploits and transfers time-critical observations and tactical lessons from theatre to forces preparing for operations. This data is concurrently transferred to relevant areas in the ALN to inform doctrinal change and procurement decisions (primarily to insert capability rapidly into theatre LCBB).
- **S4.** Adaptive Warfare Teams (AWT). 1st Division/DJFHQ has a permanently deployed AWT to support and enhance force protection within theatre by the transfer of knowledge into the force preparation cycle.
- **S5.** Trained and Experienced Lessons Practitioners. The AWB, and the wider ALN benefit from a significant pool of trained and experienced lessons practitioners; trained in data collection and analysis upon posting into the Branch. Periodic training is conducted to solidify and further develop skills.
- **S6.** Scientific Rigour. Operation Analyst (OA) and DST Group support. The AWB transfer of knowledge is underpinned by a robust analytical capability that not only facilitates the identification, but also the validation, of lessons.
- **S7.** Knowledge Transfer. AWB has developed and disseminated products to meet the needs of Army, including:
    - A series of Pre-deployment Handbooks which are disseminated to personnel deploying overseas via 39 PSB and to units preparing to deploy and Post Operation Interview Booklets.
    - The AWB SharePoint site provides a single point of reference for AWB products, and provides links to other ALN and relevant international websites.
    - Support for pre-deployment briefings delivered by 39 PSB during the Force Preparation Course that include a briefing on lessons products.

Weaknesses:

- **W1.** Absence of Learning Doctrine and Policy. The primary identified weakness within the Army Learning Environment and the wider ADF Learning Network is the absence of endorsed Lessons doctrine, policy or guidance. Updated to reflect CA Adaptive Army direction in 2009, DI(A) Operations 10-1 Draft Army Lesson Policy provides a clear learning loop framework that illustrates the overlapping nature of each loop, and most importantly, provides clear decision authorities for 'immediate', 'short', 'medium' and 'long' learning responsibilities. In the absence of an endorsed policy, solutions are being implemented in Lessons Network nodes that arguably exacerbate stove-piping and prevent knowledge transfer across the network.
- **W2.** Absence of a Process for Lessons Validation. The evolved Tactical Short Lessons Process has identified validation as a critical step to ensure that identified lessons are actioned into lessons learned. The need for validation of lessons has been endorsed and accepted as critical within the Joint Lessons Doctrine and informally by the ABCA Lesson Community of Practice Partners. The Army Lessons Domain Manager (HMSP-A) is responsible for the coordination and synchronisation of the ALN; however, it is unclear who is responsible for the validation of lessons.

Opportunities:

- **O1.** Collaboration between Network Nodes. There is opportunity within the Army Learning Environment to better achieve:
    - Learning transfer across the network to inform doctrine, training and education.
    - Collaboration between network nodes to maintain oversight of all network node activities and synchronise analysis of PORs.
- **O2.** Common Systems, language and learning processes. Current differences in lesson processes and the application of data collection methods identify the need for a standardised wider ADF Learning Network system, language and processes. The likelihood of joint lesson information sharing systems, language and learning processes provide an opportunity to standardise the current ADF Learning Network.
- **O3.** Domestic Operations. As operational tempo reduces, AWB has the opportunity to support the capture of lessons from domestic operations (e.g. G20), exercises, amphibious certification, and Defence Aid to the Civil

Community. To maximise lesson collection from these activities, clear areas of responsibility for collection against these activities is required.

- **O4.** Joint Tactical Learning. Leverage off of AWB mentoring the development of a RAAF Lessons Capability to develop a Joint tactical learning environment to collaborate, share information and adapt learning within the Joint arena.
- **O5.** Opportunities exist to further develop and disseminate products that 'push lessons' to Army more broadly.

Threats:

- No threats were identified.

5.10.Appendix E. TOWS results

TOWS - CAL: STRATEGIC DRIVERS

Action No.	Action Description	Stategic Drivers
A2	Review lessons products and their distribution/integration into wider Army (T3, T5, O8, W3, W8)	Market CAL efforts through delivery of Targeted Effects
A4	Promotion of lessons outcomes and lessons capabilities in different forums (e.g. conferences, journals etc.) (T3, T5, O1, W2, W3)	
A5	Develop an active marketing strategy that focuses on outcomes (T5, O5, O7, W3, W8)	
A8	Through lessons training and support, actively demonstrate the benefits of CAL processes. (T2, T5, W3, W7)	
A12	"Roadshows" communicating CAL capabilities across FORCOMD (O1, O2, O8, W3, W8)	
A17	Continuously improve and expand training program to ensure the lessons process is appropriately applied (T4, W7, O2, S2, S4)	
A19	Maintain CAL flexibility to address senior leaders short term problems as a mechanism to influence decision making.(T2, T5, O1, O5, S3, S5)	
A1	Incorporate a holistic lessons approach as standard business practice within Army collective training and modernisation (T1, T2, W1)	Institutionalise behaviours that captures relevant information into a single database
A3	Develop and empower a coordinitating authority for the ALN that is decisive (T1, T2, T3, W1, W2, O9)	
A6	Actively engage in the selection and implementation of a single process for Army lessons (T4, W7, S4, O4)	
A11	Use technology advancements to facilitate remote observation submission (O6, O7, O8, W6)	
A13	Setup interactive kiosks (e.g. in messes) to allow better access to CAL DB for both push and pull of lessons (O6, O7, W6)	
A18	Educate Army (& the wider lessons community) on the pitfalls of linking lessons processes to learning loops (T1, T2, W1, W2, S2, S4)	
A21	Actively influence/lead the setting up of a joint lessons network (O4, S1, S2, S4)	
A1	Incorporate a holistic lessons approach as standard business practice within Army collective training and modernisation (T1, T2, W1)	Generate a holistic approach to lessons that deemphasises the domains of learning loops
A2	Review lessons products and their distribution/integration into wider Army (T3, T5, O8, W3, W8)	
A3	Develop and empower a coordinitating authority for the ALN that is decisive (T1, T2, T3, W1, W2, O9)	
A6	Actively engage in the selection and implementation of a single process for Army lessons (T4, W7, S4, O4)	
A7	Apply the tight C2 processes that FORCOMD demands to institutionalise integration and engagement into wider Army (T1, W5, O2)	
A15	Use FORCOMD C2 and doctrine to incorporate lessons into planning/MAP (O9, W5, W7)	
A18	Educate Army (& the wider lessons community) on the pitfalls of linking lessons processes to learning loops (T1, T2, W1, W2, S2, S4)	
A21	Actively influence/lead the setting up of a joint lessons network (O4, S1, S2, S4)	
A24	Institutionalising lessons as inputs into training activities (W2, T2, S1, S4, O2, O8)	
A3	Develop and empower a coordinitating authority for the ALN that is decisive (T1, T2, T3, W1, W2, O9)	Strategy for key leadership engagement
A4	Promotion of lessons outcomes and lessons capabilities in different forums (e.g. conferences, journals etc.) (T3, T5, O1, W2, W3)	
A5	Develop an active marketing strategy that focuses on outcomes (T5, O5, O7, W3, W8)	
A7	Apply the tight C2 processes that FORCOMD demands to institutionalise integration and engagement into wider Army (T1, W5, O2)	
A16	Review all ALN decision groups/boards (e.g. ACDG, FGLB, ALAB) to ensure the appropriate membership and TORs (T1, T2, T3, O5, S2, S3, W1)	
A19	Maintain CAL flexibility to address senior leaders short term problems as a mechanism to influence decision making.(T2, T5, O1, O5, S3, S5)	
A1	Incorporate a holistic lessons approach as standard business practice within Army collective training and modernisation (T1, T2, W1)	Refocus from operations to FORGEN (esp. readying)
A9	Re-focus resources on supporting lessons from FORGEN training exercises (O2, O3, W3, W4)	
A10	Utilise CAL's strengths (including geographical proximity to training schools) to focus it's activities on supporting the "readying" brigade (O8, O9, W3, S3)	
A12	"Roadshows" communicating CAL capabilities across FORCOMD (O1, O2, O8, W3, W8)	
A15	Use FORCOMD C2 and doctrine to incorporate lessons into planning/MAP (O9, W5, W7)	
A24	Institutionalising lessons as inputs into training activities (W2, T2, S1, S4, O2, O8)	
A11	Use technology advancements to facilitate remote observation submission (O6, O7, O8, W6)	Enhance existing collection & analysis capabilities through technology insertions and collaborations
A13	Setup interactive kiosks (e.g. in messes) to allow better access to CAL DB for both push and pull of lessons (O6, O7, W6)	
A14	Develop blogs for intellectual discussion of observations and insights (O7, O8, W2, W3)	
A20	Employ modern data-mining and analytical techniques to support trend analysis (S1, O6)	
A22	Develop product that is specific for, and value adds to Army Modernisation research/initiatives (W8, S2, O5, O6)	
A23	Build on existing relationships with academia and professional groups to enhance CAL's analysis processes (S1, S2, W2, W8, O6)	

TOWS - G7: STRATEGIC DRIVERS

Action No.	Action Description	Stategic Drivers
A1	Re-write lessons doctrine (DI(A) OPS 10-1) and get approved, defining the set up a coordination authority for the whole of the ALN; the role of the FGLB as a decision-making board; roles and responsibilities across the ALN. And sequentially, update lessons-related TTPs, SOPs, Instructions etc.	Generate a holistic approach to lessons and institutionalise behaviours that captures relevant information into a single database
A2	Earlier briefs to project staff (DGLD, DGMOD-A) on EX Hamel and Talisman Saber planning to facilitate engagement on exercise design for trials. G7 staff to sit on project boards to facilitate awareness of and input to trial planning.	
A4	Set up collective forum of SO1s from across ALN and empower to make quick decisions; for example, on specific areas for data collection and to approve OILs for use.	
A5	Support CAL initiatives on lessons training.	
A3	Employ cilvilian Operations Analysts (e.g. DSTO embeds) within the relevant parts of the ALN to better support lessons analysis and monitoring, to suppliment military skill sets.	Enhance existing collection & analysis capabilities through technology insertions and collaborations
A6	Develop a Army lessons software system with a single point of access (linked to multiple databases) with easy to use interface to improve usability; kiosks to facilitate access to ALN data systems. Supported by appropriate training.	