

Quo Vadis, Militare?

Evolution of Military Affairs from a Business Architecture Viewpoint

by *Juha Kai Mattila and Simon Parkinson*

Resumé

Många militära organisationer har misslyckats med att implementera sina system för ledning, kontroll, kommunikation, datorstöd och information (C4I) med systemet för Enterprise Resource Planning (ERP) (resursplanering för företag). Denna uppsats närmar sig de militära frågorna ur en affärsarkitektonisk synvinkel. Vidare försöker den skapa ett verktyg för att hjälpa utvecklare att analysera situationen i företaget, och förutse utmaningar i genomförandet av C4I och ERP-relaterade färdigheter. Den föreslagna åtgärdsplanen för den evolutionära arkitekturen granskar militära frågor ur ett konfrontationsperspektiv och beaktar organisatoriska strukturer samt en strategisk resursstrategi som fokuserar på företagsnivå. I åtgärdsplanen förklaras den dynamiska karaktär som militära angelägenheter har, så att man undviker den lineära funktionen hos befintliga arkitektoniska strukturer. Följaktligen, föreslås här en mer balanserad system-baserad modell för militärvetenskap och en kunskapsbank för företagsarkitektur. Den hjälper också utvecklare att överväga olika metoder för att vidareföra militära resurser och kultur utan att skapa oöverstigliga hinder mellan de införda informationssystem och befintliga vanor

WITH ENTERPRISE ARCHITECTS (EA), organisations have been trying to understand the evolutionary nature of military enterprises when defining the end states for development strategies. Quite often EA's have been surprised with either the slowness or quickness of an enterprises abilities to adopt new means and ways in force generation, support, and utilization. This paper builds a model at the military affairs level that provides an improved understanding of the transformational forces and, maybe, predict the possible future structure.

Military affairs are studied from the view of business architecture,¹ which, in a military context, can be seen in three essential parts. Firstly, the structure of enterprise governance. Secondly, the processes and information in the context of potential adversaries. Thirdly,

value chains through the force generating society, strategy, and politics. There are many business architecture modelling frameworks, industry-specific and reference models for the private sector and the governmental affairs (Zachman, OMG, BAG, TOGAF, eTOM, SCOR, PCF, FEAF), but few are applicable for the military at a higher level. On the other hand, there are many lower level military architecture frameworks (DODAF, NAF, MODAF) but they are either technically oriented or remain at a lower level of modelling.²

Consequently, this paper studies the dimensions of military affairs across business strategy,³ military capability,⁴ and value stream⁵ in the context of enterprise evolution,⁶ where:

1. Business strategy is management’s game plan for strengthening the performance of the enterprise.
2. Military capability is the ability to achieve a specific military objective which the US assesses in four components: force structure, modernization, readiness, and sustainability.⁷
3. Value stream defines “the set the end-to-end activities that deliver value to external and internal stakeholders – transcending organizational boundaries”.⁸

Enterprise evolution is balancing the stability the enterprise requires to thrive and the novelty the enterprise needs to transform itself. There are four main theories of organizational evolution:

1. Organization changes on its own accord following predetermined road map and achieving aspired end state.
2. Organization transforms due to the change in the environment which through variation, selection, retention, and competition select the most flexible units.
3. Organization as the complex open system adjusts continually to the changes in its

environment due the responsive processes and units.⁹

4. Human social behaviour changes the processes of organization endlessly to meet individual and group goals.¹⁰

This study uses the three dimensions and considers all four evolutionary models when studying the transformations of military affairs.

To set the environment for military affairs, the research uses the Clausewitzian triad model¹¹ of political leadership-society-military force and the interdependency between them. In the confrontation, the triad and their interrelationships are both the source of power and a potential target to the adversary. Keys to winning a war have been the annihilation of military force, capture or suppression of political leadership, turning the public opinion of the society against the other, or isolating either of the entities from the others.¹² For simplicity, the research does not extend to political, economic or sociological lines of force projection¹³ but focuses mainly on military force projection.

Military force is considered as a complex, open socio-technical system with three core

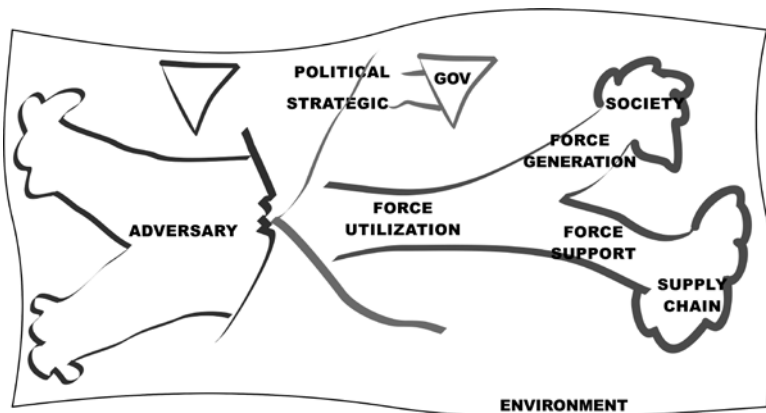


Figure 1: High-level reference model of Military Affairs.

processes: force utilization, force generation and force support.¹⁴ When these processes are illustrated in an environment of confrontation, the following Figure 1 helps orientation through the research.

The force utilization means that force elements are deployed in operations to project the military force for ameliorating, containing, deterring or destroying.¹⁵ Use of force is the primary way to affect the adversary's triadic structure. The avenues or dimensions of delivering the effect are typically space, air, maritime, land, electromagnetic and cyber.¹⁶ Other dimensions in battle space may also be resources and time.¹⁷ Most of the dimensions are at the physical level, but all aim to change human behaviour; the physical event needs to be translated into information, which needs to be received by a human to change his/her behaviour.¹⁸

The force support means the ability to maintain constant intensity and duration of operational activity in achieving military objectives.¹⁹ Force support extends out from the military organization using supply chains that may be global in reach, which means dependence on a more extensive network for value creation.²⁰ Supplies are required to sustain the fighting power. Disabled parts of force element need to be evacuated from the battlefield and restore their ability to fight. It is essential to evacuate wounded to sustain their health and prevent the loss of fighting morale.²¹

The force generation or production brings together doctrine, people, and equipment forming them into force elements with the desired abilities. Force generation is a continuous process to develop operational and organizational doctrines and then combines them with technologies, material, workforce,

and available resources to produce combat capability.²²

Training of troops is the most visible part of force generation. Armed Forces recruit their members from the society either by hiring volunteers or acquiring them through compulsory military service. By combining people with military equipment using doctrines, the Armed Forces provides basic and specialised competency for forces to be able to defend their society.²³ Once achieving a sufficient level, this capability is either provided to combatant commands as force elements or sent to reserve for a possible later need. Training needs to be refreshed before sending a reserve force into operation. Force generation also includes the development of material-based capabilities by acquiring and integrating them into existing force structures.²⁴

The interconnected system of military affairs is commanded and controlled by a command structure that extends towards all stakeholders of the value-creating network with contracts and obligations based on legislation. National law can only control domestic resources. Thus, coalition structures are needed to ensure the strategic durability of a nation.

The research first takes the previously explained high-level reference model for military affairs, applies a merged model for strategic development, evolutionary forces, and self-evolution, and finally reflects changes through the history starting from the 30-year war (1618–1648) and ending at the Russian exercise Zapad September 2017. The research aims to define an architectural roadmap tool for military business architects and prove its feasibility in contemporary military capability development.

% of failed ERP causes	Customer	Vendor/Product	Integration problems	Data migration	Process change	Failure to deliver benefits
Cutter 2006 ²⁵	50	94	42	80	98	72
CIO 2010 ²⁶	25	25	62.5	37.5	50	100
CIO 2017 ²⁷	40	10	40	70	40	90

Table 1: Typical causes for Enterprise Resource Planning or similar application package implementation failures over time

Are there better maps for orienteering on the roads of military evolution?

Implementing application packages (CRM, HR, ERP, SCM, C4I, et cetera) has not been without challenges as the brief review of causes for failures over ten years show in Table 1.

Three studies merged from over a ten-year period, as shown in Table 1, illustrate that while software packages may have stabilized over the years, problems remain in customer’s ability to explain their business functions and foresee the integration chal-

lenges. Similarly, the data migration remains a leading cause for challenges together with failure in process changes. Together 80 % of failed ERP package implementations 2017 were suffering from the misunderstanding or misalignment between system and business functions. This indicates that the competency of business architecture has room for improvement.

One probable reason to explain these architectural shortfalls may be the models used. Taylor²⁸ defined a scientific method for labour division and management. Weber²⁹ improved the understanding of management and bureaucracy. Porter³⁰ defined a method

BA models vs. change	Strategy/ Blocks	Capability	Value stream	Evolution
Zachman	+	Yes	-	Linear
OMG	+	-	-	Linear
BAG	+	-	-	Linear
TOGAF	+	Yes	-	Linear
eTOM	+	-	Yes	-
SCOR	+	-	Yes	-
PCF	+	-	-	-
FEAF	+	Yes	-	Linear
DODAF	+	Yes	-	Linear
MODAF	+	Yes	-	Linear
NAF	+	Yes	-	Linear

Table 2: Features of significant business/military architecture frameworks and reference models

to assess business strategy in the interaction of competition, environment and company core components. Beer³¹ created a viable system model to help in understanding the management of an adaptive system. Hamel and Prahalad³² introduced the core component (competency, processes, and business) oriented business model. Senge³³ explored further the organizational learning abilities. Unfortunately, the existing business architecture frameworks or reference models do not support the evolution, value stream, or intra-enterprise drivers for development as presented in the following Table 2.

Frameworks and models help in defining and documenting the building blocks of business structure but less the integration between them to create capabilities. Even fewer models can describe value streams, and none of the models recognise other evolutionary ways, but only a predetermined roadmap for enterprise change. There is a gap in the available models' ability to

assess other ways of enterprise evolution when driven for example by a change in environment, continual transformation, or social behaviour.

As previously analysed, the primary challenge is the lack of value stream and evolutionary transformation models or as David Bohm³⁴ says:

What is needed is a relativistic theory, to give up altogether the notion that the world is constituted of basic objects or building blocks. Rather one has to view the world in terms of the universal flux of events and processes.

The quest is to find models that simultaneously help the architect to understand over which roads the enterprise has travelled; where precisely the enterprise is currently with its competencies, processes and value streams; and what possible paths of evolution the enterprise may either drive towards or be driven towards in the future. The confrontation

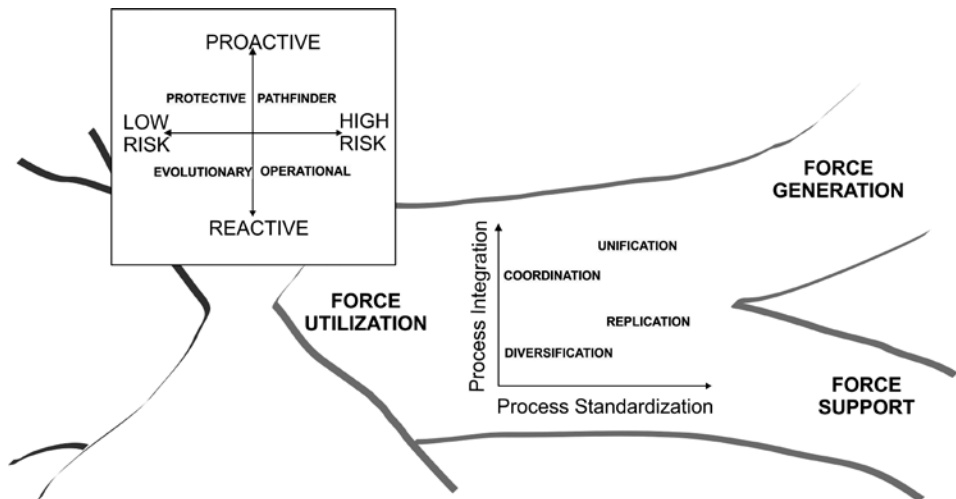


Figure 2: Confrontation posture and military process framework.

model from Clausewitz combined with the military capability model explained in the introduction creates the context in Figure 2 to introduce the business architecture model.

The strategic confrontation posture view (top left) classifies a military enterprise's ability to manage risks and approaches to action (proactive or reactive). Gattorna³⁵ uses these two dimensions to assess the enterprise social capabilities when facing the competition.

Firstly, Evolutionary means that the enterprise adopts new abilities with minimal risks and takes careful steps while focusing on sustaining the performance of existing capabilities and processes. The Defence Forces of Finland were in this posture compared to the Soviet Union during 1970–1980's.³⁶

Secondly, if social behaviour can tolerate more risk but cannot build significantly different capabilities, then the enterprise may drive towards Operational Dominance. Operational Dominance means doing things right, faster, more robust and using more resources than an adversary. According to General McChrystal,³⁷ The U.S. Special Operation Command was in this posture during operation in Iraq until 2003.

Thirdly, if the social behaviour prefers to minimize risk, but it has achieved some unique capabilities previously, the enterprise may adopt a Protective Posture. The Protective Posture includes building on existing strengths and improving their quality while same time tries to prevent adversaries gaining the same dominant posture. According to Pellerin,³⁸ the U.S. has possessed this posture since their technological dominance has gone unchallenged in every operation domain – space, air, ground, sea and undersea for the past 25 years. Today though, their competitors have aggressively followed with capabilities to deny the US

access to theatres of operation and claim their freedom of manoeuvre.

Fourthly, if the social behaviour prefers taking risks and having a proactive strategy, the enterprise may adopt a Pathfinder posture. Achieving at the Pathfinder position means driving innovation and development and adapting novel solutions while trying to improve the agility of the enterprise. According to the assessment by Finland MoD,³⁹ the Russian military and defence industry under the guidance of Vladimir Putin chose a path towards the Pathfinder posture when they transformed their old, cold war force towards modernized, digitized force since 2000. The Russian strategy also copied the old Soviet doctrine of using defence industry to drive the innovation economy. The Armed Forces of Sweden tried to achieve this posture with a Revolution of Military Affairs programme after the fall of the Soviet bloc.⁴⁰

It seems possible to recognise different strategic postures of military enterprises using Gattorna's framework. The architect may be able to use the framework in clarifying the position or a possible shift in defence aspirations. There is a significant difference in designing information system implementation for the enterprise that prefers to be reactive rather than proactive.⁴¹

The other graph in Figure 2 is the structure of the enterprise, its processes and value streams, a tool to analyse process structures of an organization, developed by Jeanne Ross, Peter Weil and David Robertson.⁴² The model defines two dimensions; process integration, and process standardization. These two dimensions outline the strategic operating model for the enterprise to arrange its processes and value streams: Diversification, Replication, Coordination, and Unification.

The diversified operating model is evident in the loosely integrated military enterprise, where smaller, independent forces are con-

ducting operations independently in separate areas of operations. They are autonomous in their command, functions, support, and most of their development. The autonomous forces fight differently, support their action and develop their forces uniquely. These military organizations are usually hierarchically arranged, and value is created vertically along the lines of command. This operating model was typical in WW I when infantry and artillery regiments fought their battle separately.⁴³

The replication operating model is trying to enhance operational efficiency by standardizing the processes but not integrating them. The goal is that similar force components execute standardized processes faster than the adversary. They may engage the enemy in different areas of operation but fight similarly. The Commander in Chief is controlling the force production and support to maintain and improve standardization. There might be an inspector institute (for example Finland Army Command)⁴⁴ guiding the development of arms and force generation. The Western militaries were generating their forces before the WW II arranged in regiments of the branch (artillery, infantry, cavalry, engineers, signals), i.e., replicated the training significant to each branch, and learned during the war to create multi-arms brigades for combined arms effect.⁴⁵

The coordination model integrates different processes aiming to optimize the operational efficiency. Multi-arms effects are used to engage a joint adversary in each area of operation. Operational level autonomy of force utilization is enabled by coordinated efforts of force production and support. The Commander in Chief is coordinating the effort of each, possibly a specific, force element. Coordination requires a pervasive command and control system. The classical example is a combined arms brigade, where

unified command and control makes all the different arms and branches fight together.⁴⁶ Lately, a flatter organization has been called a network-centric force.⁴⁷

The unification model combines integrated processes and standardized force elements. The operating model aims to maximize operational effect and effectivity through similar force elements all facing the same kind of adversaries in their area of operation. Processes are owned by the Commander in Chief or his staff and developed centrally. The maturity of processes enables deep specialization of units since they are always used in combined arms and joint manner. McChrystal⁴⁸ created a force that was working as a team of teams; – many similar special operations teams that were fighting against Al-Qaeda in Iraq as one extended enterprise.

The research assumes that Clausewitzian confrontation model defining the core processes (abilities) of military affairs is the right context to use Gattorna's strategic posture model for value chains in parallel with Ross et al. enterprise operational model in assessing the evolution of a military enterprise.

Drawing a New Roadmap for the Evolution of Military Affairs

This section will test the research question of: "How well does the hypothetical model explain the evolution of military affairs?" The test is a longitudinal case study finding the first successful combined arms operations in the 30-year war ending around 1648 and following the main changes in military affairs to current time with Ross et al. operational model.

The evolutionary story of military affairs is explained in four subsections to follow.

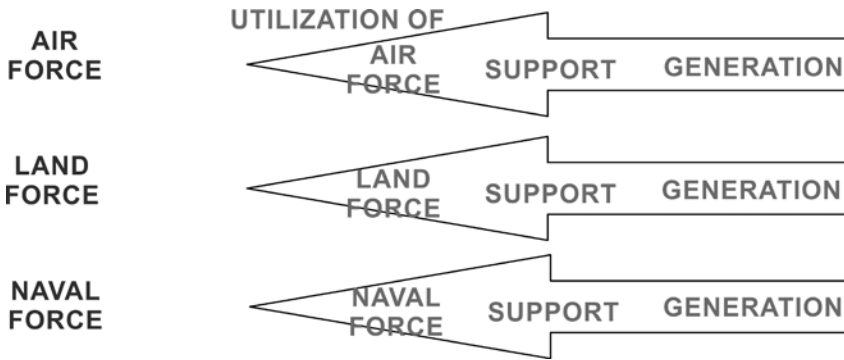


Figure 3: A model of diversified military force.

Diversification as natural outcome of evolution

I hope none of you gentlemen is so foolish as to think that aeroplanes will be useful employed for reconnaissance from the air. There is only one way for a commander to get information by reconnaissance, and that is by the use of cavalry.

General Sir Douglas Haig addressed the British Army Staff College in summer 1914.⁴⁹

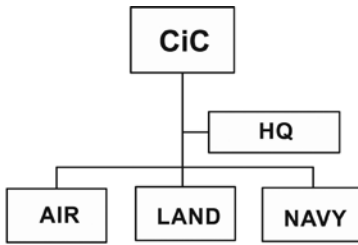
Diversification seems to be the natural beginning of the evolution of services. First land or ground forces were created to protect agricultural assets. Then naval forces to protect critical channels of commerce. Lastly, air forces to utilize industrial technology for mobility and provide a strategic advantage over both land and naval forces. All three services were fighting their war facing their equivalent adversary in land, sea, and air with only secondary support to each other. Their force generation and development were different, and they needed specific support and supplies as illustrated in Figure 3.

The combined arms tactics for land forces was invented and developed by Gustavus

II Adolphus (1594–1632), who manoeuvred with a combination of infantry, cavalry, and artillery (fire, manoeuvre, and protection) preferring movement and attack over fortification.⁵⁰ He was also the first to use replication strategy when he standardized each arm to have pistols of the same calibre, same size swords with cavalry, same calibre muskets with infantry and first light, mobile, regimental artillery with a controlled variation of their calibre.⁵¹

The modern, multi-capable air force was created by Germany 1924–1939. Due to the constrained resources and geopolitical reality, the Luftwaffe did not adapt Giulio Douhet's ideas⁵² for strategic bombing but developed more close air support capabilities for ground operations and protection of the primary ground assets.⁵³ Consequently, the Luftwaffe built more flexible air force capabilities than its adversaries who were concentrating on building strategic bombing capabilities.

The command and control topology of diversified force is following the primary commander – staff structure illustrated in Figure 4.



CiC = Commander in Chief
 HQ = Headquarters

Figure 4: Command and control structure of diversified military enterprise.

Commander in Chief (CiC) has all three services directly under his command. Each service is confronting their adversary in their dimensionally constrained area of operation. The CiC is supported by headquarters (HQ) providing strategic guidance, sufficient future views, expert advice, and administration support. There is little or no need for coordination between services as they are independent of tactical and operational levels. Commanders of the services are deciding both issues in current operations

and in building future capabilities. Moltke Sr. (1800–1891) was one of the first to decentralize command and control of this line-staff organization by introducing a mission. Instead of orders (Befehle), he preferred instructions (Weisungen), that provided subordinate commanders with freedom of action as situation emerged.⁵⁴

The Diversified services with only strategic level Commander in Chief structure is quite usual for peacetime armed force enterprises. The Swedish Armed Forces were arranged this way before they launched the revolutionary transformation mid-1990s.⁵⁵ Most of the European NATO countries had this structure until they began transformation activities after the London Declaration 1990.⁵⁶ NATO updated its command structure 2003 still following these traditional lines.⁵⁷ U.S. forces were structured this way until 1983,⁵⁸ when they established the unified combatant commands to execute operations in geographic areas of responsibility directly under the leadership of the President of US. The services remained hidden in the structure were renamed as component commands.⁵⁹

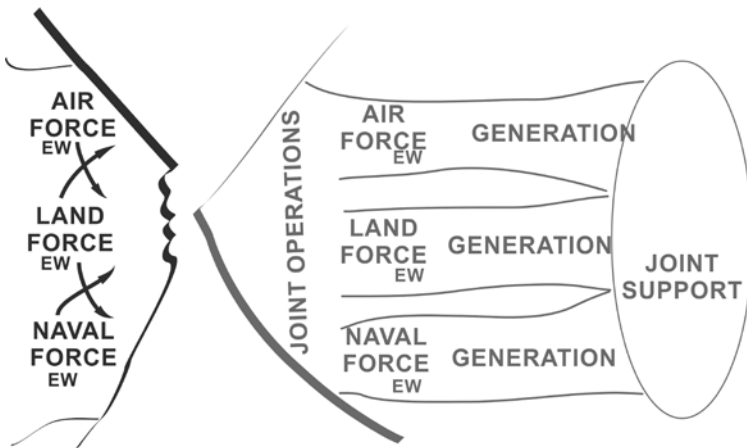


Figure 5: Unified military effect with coordination and unification models.

Seeking coordination and unification

It takes all our services together plus the industrial efforts of our Nation to win any major war.

General Omar N. Bradley⁶⁰

Armed forces have started to seek coordination and unification as their adversaries' doctrine has evolved more towards combined arms tactics⁶¹ and joint operations.⁶² In some areas of operation, no one service can sustain their force or fight with success alone. The availability of combined arms/branches/services capabilities in operation releases more options for the commander to counter the enemy courses of action. The Joint Force also allows the operational commander to pose multi-dimensional threats to the enemy as illustrated in Figure 5.

The cooperation between Air Force and Land Force that the Wehrmacht invented back in 1930's was reinvented by NATO and launched as AirLandBattle in 1984.⁶³ The AirLandBattle aimed to coordinate engagement against all three echelons of Soviet armoured troops at the same time.

The principle of unified action become more critical as an adversary was unifying their service components. Also, the efforts of other than military forces were included

into this unification. Thence, unified action has become "a comprehensive approach that synchronizes, coordinates, and when appropriate, integrates military operations with the activities of other governmental and nongovernmental organizations to achieve unity of effort".⁶⁴ Furthermore, this gradually led to the introduction of the Joint Combatant Command, which was organized for a mission or a theatre and had both Joint and service components. The coordination of force utilization led into defining joint functions like Command and Control, Intelligence, Fires, movement and manoeuvre, protection, and sustainment. These functions were to integrate with each other and with the operational and tactical functions of each component.⁶⁵

The force generation, and to some extent also force development, remains diversified and autonomic within each service. The service became a provider of force elements, and their force utilization was controlled by component command subordinated to joint combatant command. The USA was amongst the first to adopt this structure in 1983.⁶⁶ The rest of NATO followed starting from 1990.⁶⁷

The 'tail' of armed force has sometimes been reformed following the unification strategy. Namely, logistics has been considered like other services, and standardization of

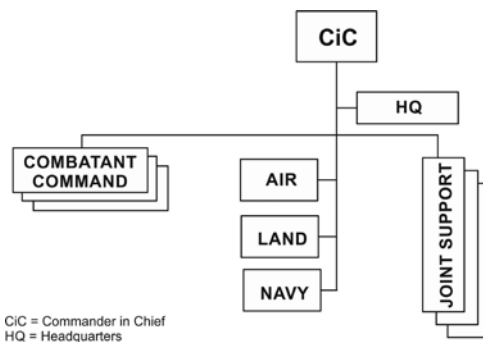


Figure 6: The command and control of unified military enterprise.

supply and service functions have promised improved efficiency. Joint logistics has been considered an “art and science of planning and carrying out, by a joint force commander and staff, logistic operations to support the protection, movement, manoeuvre, firepower, and sustainment of operating forces of two or more Military Departments of the same nation”.⁶⁸

The organization of military force, after reforms in coordination and unification, is illustrated in Figure 6.

The commander in chief is supported by general staff headquarters to manage the strategic level. The actual operations are divided into missions or theatres under a Joint Combatant Command that utilizes force elements in coordination.

The services produce and develop force elements and provide them for the Combatant Command. Logistics are mainly arranged under one unified Supports Command that provides support to both diversified services and Combatant Commands.

Following the 2010 Defence Reform Review, the U.K. MoD began its transformation towards a unified model for defence affairs, achieving full operation on 1st April 2014.⁶⁹ The adopted structure is shown in Figure 7.

The Permanent Joint Headquarters and Directorate Special Forces are commanding all operations abroad. Force elements are provided by Navy, Army, Air and Joint Commands. Both combatant commands and development commands are enabled by enterprise services provided by Defence Business services, Defence Infrastructure Organization, Science and Technology and Ministry of Defence Police. The supply chain required to support armed forces is managed by Defence Equipment and Support and Information Systems and services.

Optimizing the effect and consumption of resources

The operational space has evolved into three levels (physical, information and cognitive).⁷⁰ Besides the military line of operation, there are also other ways to project power, namely political, economic and social. The dimensions of military operations at the physical level have evolved to include space, air, maritime, land, electromagnetic, and cyber.⁷¹ As the complexity and spectrum of operations are increasing, and value chains are becoming longer, the unification towards a fully joint force becomes an aspiration. NATO was calling this doctrine as the “Comprehensive Approach” from 2011 when they updated the list of tasks in NATO Action Plan.⁷²

The multiservice force presents a flexible combination of capabilities against an adversary that aims to gain an asymmetric advantage. Multiservice capabilities provide the commander a broader spectrum of options at a technical, tactical and operational level to strike against vulnerable points of enemy structure. This way, the commander has more courses of action to unify the effort in massing the effect to take down enemy centres of gravity.⁷³ The enterprise model for coordinated value chain force is illustrated in Figure 8.

The Combatant Commands, defined to project force in all four lines of operation, are provided with specialized units that fit best for a concept for operations. Additionally, they coordinate effects delivered by multinational force units and both governmental (GO) and non-governmental (NGO) organizations, not under the military command. The ISAF 2001–2014 had a broad and diversified spectrum of operations, enabling the Afghan government to provide sufficient security across the country and develop a new

UK 2014

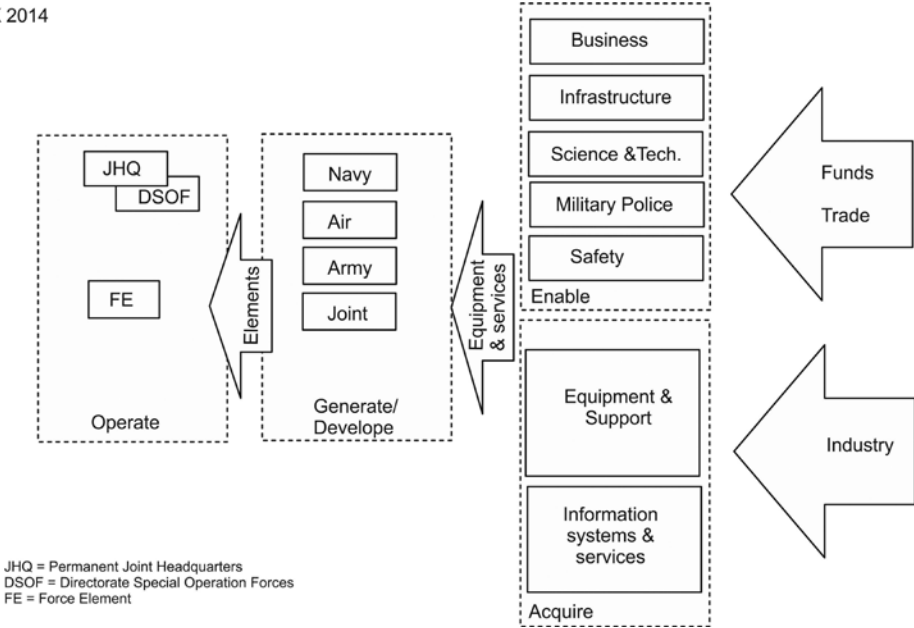


Figure 7: The structure of UK Armed Forces 2014 onwards.

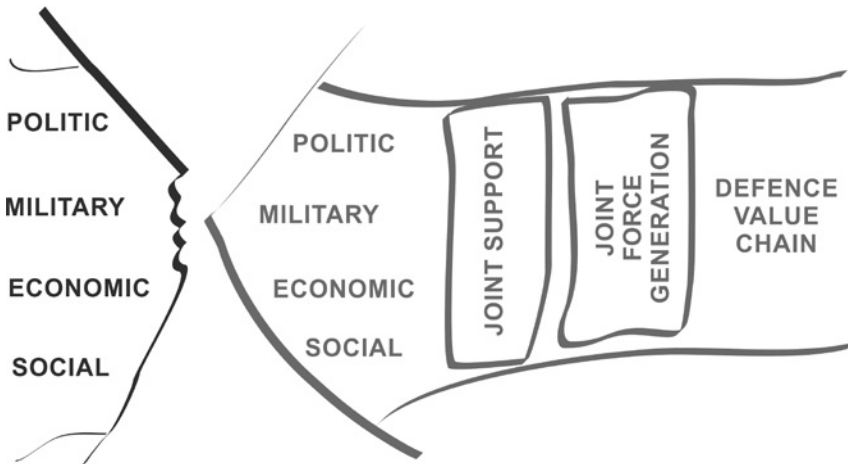


Figure 8: The coordinated value chain as an operating model for military enterprise.

Afghan security force. At its height, it included troops from 51 nations. About the same time, the UN was investing in Afghanistan around 291 million dollars via 30 different UNAMA projects to achieve sustainable and profitable development through local communities.⁷⁴ In addition, there were UNHCR, Red Cross, Red Crescent, and many other NGO organizations operating in the area.

The force generation still includes domain-specific features in troops' training but for example simulation training is progressively provided in combined arms context. There is also a tendency to expose troops to combined arms live fire before sending them to operations or reserve. Some countries, like Sweden, have merged their service Commands to the Joint Commands for operations, production and support.⁷⁵

The supply chain that is needed to support both force generation and force utilization is a global interdependent value chain. The value chain is required to provide accurate and on-demand supplies out of more constrained and degraded logistics resources. The solution is a globally integrated Joint Logistics Enterprise.⁷⁶ The supply chain is composed of modularized supply nodes⁷⁷ that are connected by information and transportation networks. This globally integrated logistics can provide support swifter with an on-demand basis allowing leaner force elements in operations. The development of technology increases the demands for specialized logistics, but, on the other hand, it simplifies more material-oriented units of logistics. The three-dimensional (3D) printing or additive manufacturing enables the production of spare parts, artificial organs, and housing facilities just-in-time within the area of operation (AOO) from simple ingredients.⁷⁸ The service-oriented archi-

ture, object-oriented programming, and software-defined features enable new ICT services produced in the AOO just by configuring ready-made applets or release of new software components.⁷⁹

The planning, preparation, and execution of the joint operation are far more complicated than any single service operation.⁸⁰ Thus, the traditional military command and control are an overly constrained means of governing the military enterprise. The value chain supporting current operations both with supplies and new force elements is mainly process-based, and trust between different entities in the chain is maintained by agreements and contracts as shown in Figure 9.

The operation command is more orchestrating the value chain than issuing orders to subordinates. The orchestration means operational analysis, clear intent and its communication, coordination, synchronization, and assessment of combined and joint efforts to gain integrated and multiplied effect in adversary's system.

The Swedish Armed Forces⁸¹ are one of the closest to the model of a unified value chain enterprise as illustrated in Figure 10.

The Commander in Chief is supported by Armed Forces Headquarters consisting of three staffs: Planning, Joint Forces Command, Training and Development Staff. The Joint Force Command is responsible for all operations and command of the force elements in operations. Training and development staff oversees force generation, logistics, and medical services. Directly under the Ministry of Defence is the Defence Materiel Administration responsible for material development and sustenance.⁸² Also in the UK, a discussion has surfaced about merging the current air, land,⁸³ and Navy organizations.⁸⁴

Figure 9: Command and control of value chain operating model.

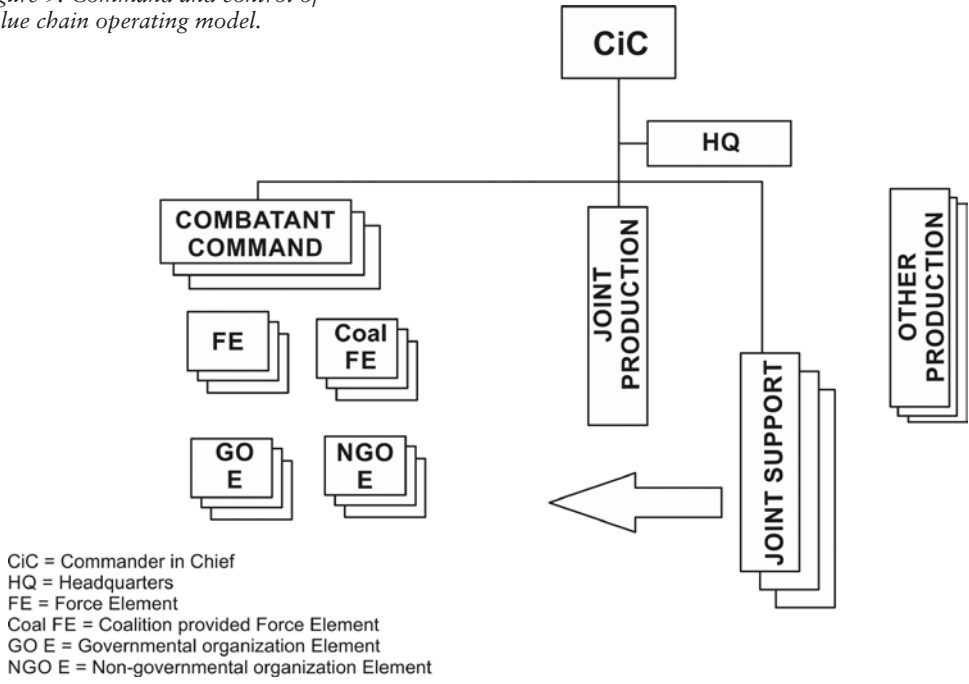
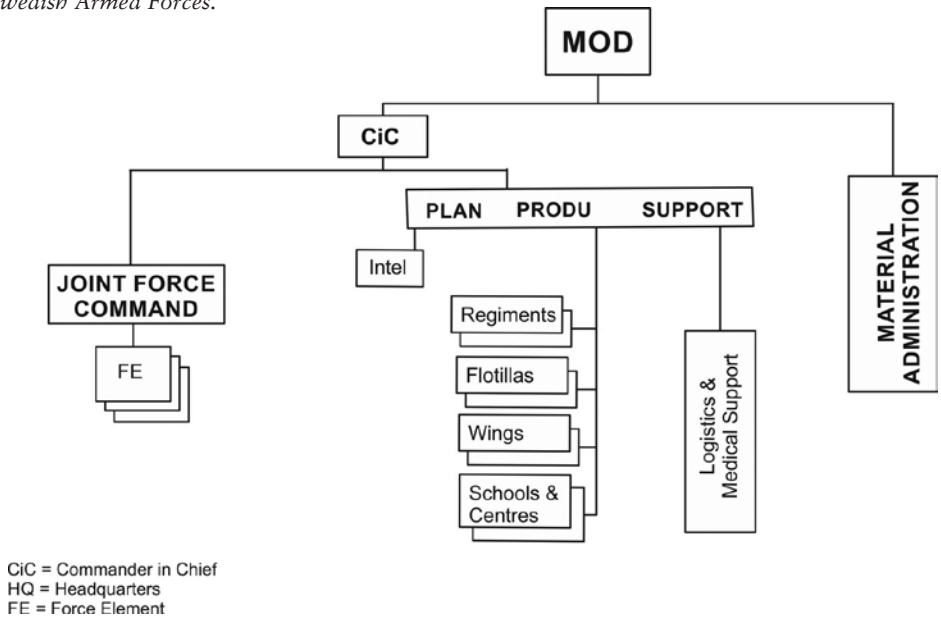


Figure 10: Unified value chain structure of Swedish Armed Forces.



RUS 2016

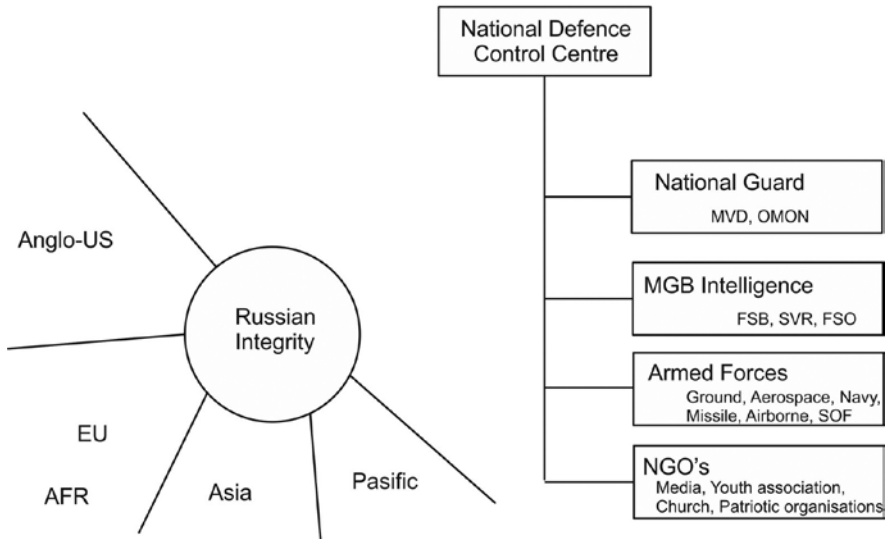


Figure 11: The further coordinated operating model of Russian force elements.

Further control over the forces available for politics

The Russian command structure for force utilization has recently evolved towards a more holistic structure reminiscent of the Lenin/Stalin heritage, where military force is just one tool for national and international politics.⁸⁵ The Russians have multipolar theatres of operation as illustrated in Figure 11.

All means of force are used under the unified command of the National Defence Control Centre headed by the Supreme Commander. Five Joint Strategic Commands can each command a hybrid operation in their theatre. National Guard, Intelligence organizations, Armed Forces or any of the non-governmental (NGO) organizations

can provide troops and services for Joint Hybrid Operations.

This broader basis of forces enables addressing both in-state and international threats optimally, for example, using “little green men” in manning Crimea but denying their clear identification or having Night Wolves motorcycle club arranging celebrations of annexation as part of information operation. The Russian arrangement emphasizes the Federation’s need to have a flexible source of forces under one control and commanded by specialized Joint Command operating in all dimensions of force utilization. According to Center for European Policy Analysis,⁸⁶ the “Zapad-2017” exercise openly practises this statewide coordination over all available means of force whether military, media, social, economic, or non-governmental.⁸⁷

Evolutionary roadmap for military affairs

There is a definable path of evolution in force utilization that some Armed Forces have taken in their reformist programs illustrated in Figure 12. Diversity is typical for newly acquired capability, but gradually adversary or insight drives towards more coordinated efforts of all arms and branches. There is a natural path towards coordination, i.e., jointness if the combatant command is facing a threat or challenges from all battle dimensions.⁸⁸

From coordination, the road moves towards unification, i.e., combined arms battle groups and joint commands. Nevertheless, the unification may slip over into replication where conformity wins over the uniqueness. The peace-time comfort may cost dearly when facing an adversary with broader coordinated force elements. For example, in 1914 machine guns slaughtered the cavalry,⁸⁹ but it took until 1945 before the learned approach that

the cavalry was the ultimate attack force, was replaced by armoured troops.⁹⁰

U.S. Air Force drew lessons from the WW II deciding that strategic bombing capabilities are the most efficient force projection and almost stopped producing fighter capabilities until the losses in Vietnam made them reconsider.⁹¹ Moreover, the heavily armoured vehicles were made obsolete as they were too cumbersome and expensive to use in peace enforcing operations like Afghanistan.⁹² Now Russian operations in Georgia and Ukraine have brought up again the question of main battle tanks.⁹³

Similarly, the evolutionary cycle can be observed in Logistic and Force Support as illustrated in the examples from UK and Sweden. The tendency to create joint logistics expresses military enterprise willingness to gain cost-efficiency through replication and unification. The realisation of outsourcing and longer supply chains in sustaining fighting troops requires also improved coordination.

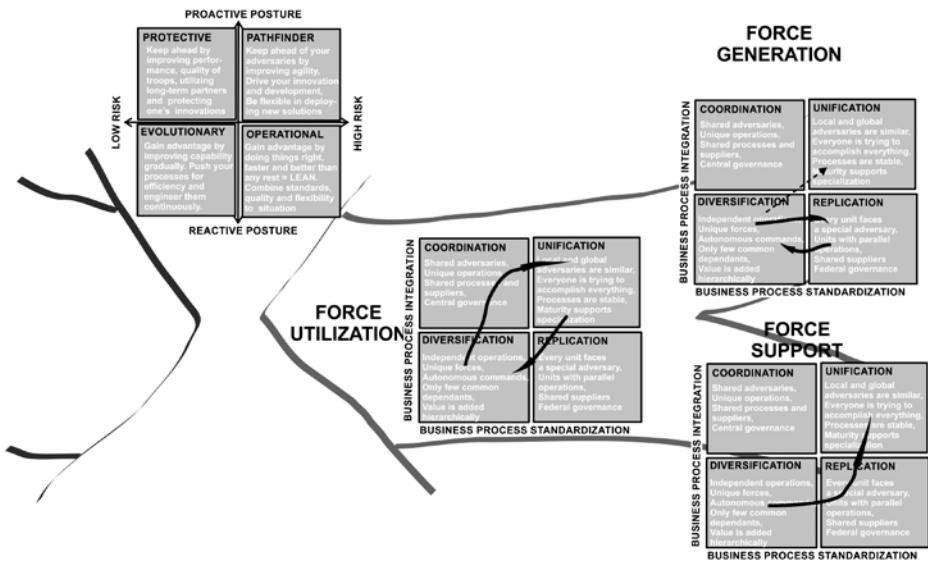


Figure 12: The roadmap model for military affairs.

The Force generation has seemingly been slower in evolution. Although, there are precedents, for example in Finland 2015, when the last single arms regiments were merged into combined arms brigades for force generation purposes.⁹⁴ Other Armed Forces still prefer training their troops in specialised regiments or equivalent institutes. Also, doctrinal rigidity is observed as U.S. Armed Forces were formed to operate according to a doctrine in Somalia, Iraq, and Afghanistan until it was proven counter effective by several individual intellectuals within the ranks and a new counterinsurgency doctrine was created and accepted officially.⁹⁵

The longitudinal study did not reveal similar evolution in strategic posture. It seems that nations in relative stability tend to maintain their posture. Finland has remained for the past 70 years in evolutionary posture. Sweden tried to switch from evolutionary to Pathfinder during 1990's and 2000's but political culture halted the transformation halfway through. In the U.S., it seems that after 25 years of being in protective position, they must improve their innovation to keep China and terrorist coalitions at bay.

Does the new map help in orienteering?

The roadmap tool was experimented with in three separate case studies trying to answer the question "How feasible is the roadmap tool for an architect when analysing military affairs?" The cases were captured from:

1. Finland focusing their command, control and communications (C3) system deployment between 1995 and 2000 (Mattila, 2014 a),⁹⁶
2. United Kingdom Armed Forces tactical and operational command, control,

and communications automation 1989–2006,⁹⁷ and

3. Swedish Defence Forces transformation from Cold war structure to Nätverksbaserat Försvar (Network Based Defence, NBD) throughout 1995–2005.⁹⁸

Hindsight is applied to the experiment to determine if the roadmap tool can help in analyses of the situation and would have made a difference in programme outcome. When applying the simplified roadmap model for military enterprise business architecture in these three cases, the results outlined in Table 3 were obtained. The experiment was first measuring the tools feasibility in recognising the posture and process ambitions in transformation cases. Secondly, the experiment was measuring possible differences in the outcome of the case programmes.

In the case of Finland, the military enterprise roadmap tool helps to position both outbound and in-house intentions of improvement and would have provided practical orientation for transformation programme. The tool would have helped the programme to understand the nature of their real mission and possibly foresee some of the opposing powers. It would have required an information architecture tool to understand the failure of situational awareness process.

In the case of UK, it was easy to determine the outbound posture and in-house transformation of the Armed Forces. The tool would have given more encouraging feedback to the UK programme than Finland but would not have foreseen the technical problems and complexity in force integration. The tool would have provided the UK a better approach to replication transformation by warning them of an overly equipment-oriented approach and possibly prepare them to meet the opposition better when trying to

	Finland	UK	Sweden
Posture analysis	Evolutionary	Pathfinder	Pathfinder
Process analysis	Replication	Replication	Unification
Possible difference in outcome of the transformation programme	Help the programme to understand the nature of their real mission and possibly foresee some of the opposing powers.	A better approach to replication transformation by warning of too equipment-oriented approach over diversified troops.	Advance with smaller and more stable development increments to keep up the transfer of cultural and attitude powers.

Table 3: The feasibility results after experimenting with the roadmap tool in three case studies from Finland, UK, and Sweden

introduce one standard way of doing situational awareness to strongly diversified troops.

In the case of Sweden, the military enterprise tool can capture strategic changes and help to foresee their challenges. Since the transformation of the enterprise is a sum of many parallel and sequenced efforts, the model is not able to foresee emergent outcomes. Nevertheless, the tool can be used afterward to seek plausible causes for success and failure.

Shall the Architect be more successful in enterprise orienteering?

The quest for this paper was to help the enterprise architect in analysing military enterprises at business levels. The paper creates a strategic theory for military enterprise analysis by using the following models:

1. The confrontation model applied from Clausewitz statement of triad between society, military, and government.⁹⁹
2. The strategic posture framework developed by John Gattorna to explain options

that armed forces can obtain in competition against their adversaries.¹⁰⁰

3. The process framework prepared by Ross, Weill, and Robertson to explain options for arranging the processes and their integration within an enterprise.¹⁰¹

The model was used to analyse several military strategies and changes in history. The longitudinal analysis revealed an evolutionary architectural roadmap for military enterprises. This roadmap tool experimented further in three different cases of information related transformations of military organizations.

In retrospect, the tool helped the architect in all three cases to explain situations, intended changes, and dynamics of failures in implementing military transformation. The roadmap tool helps to understand how confrontational strategy affects the structure and processes of the military enterprise. It also contributes to anticipate enterprise transformations between different process structures both within armed forces and with its stakeholders.

The military enterprise business architecture roadmap provides additional understanding for architects to see the dynamic journeys rather than just snapshots or lin-

ear transitions between current and future. Since the roadmap is focusing on business architecture, the other levels, namely process, information, and technology, remain to be improved with other architecture tools.

The paper does not cover the cultural, behavioural and attitude challenges of a military society in change, which is another view that has been neglected in contemporary architecture models and needs further research.

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Juha Kai Mattila is a retired Colonel from Finland and Ph.D. student at Aalto University. Simon Parkinson is an Electronics and Communications Engineer and Enterprise Architect advising military forces.

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