THE THINKING SOLDIER: REVOLUTION IN MILITARY AFFAIRS (RMA) AND KNOWLEDGE MANAGEMENT IN THE MILITARY PERSPECTIVE

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ABSTRACT

The 21st century Revolution in Military Affairs (RMA) is predominantly characterized by a rapid pace of technological change and the required transformation in doctrine and organization. The new warfare highlights the paramount importance of having a knowledge advantage over adversaries. New technologies have resulted in increasingly dynamic, unpredictable and complex operations that require people to filter and analyze information from multiple sources. Sense-making, problem solving and decision-making are more complex and more essential in military situations than ever before. Similarly, know-how, expertise, and interoperability are also dominant factors in a military organization's ability to attain knowledge superiority. Command and control is taking on new dimensions, and the role of military personnel is evolving into that of 'knowledge intensive worker'. Knowledge management (KM), which facilitates the creation and use of knowledge for increased innovation and value, could have a profound influence on the doctrinal shift anticipated by the RMA.

When it comes to technology, the Army adores reinventing the wheel. They love to be able to build or replicate every part, system and weapon all by themselves. To be dominant, self-reliance and secrecy are the obvious motive. However, in the current environment, when economics itself is becoming networked and all activities are transparent, this is perhaps no more possible or desirable. Whilst, the Napoleon's Army may have had marched on its stomach, the thinking soldier in the near future will be required to march on their head. The application of KM principles and techniques in the military that could affect how new military technologies are employed and how army doctrine evolves is deemed crucial to be examined. This paper presents the important to determine how KM is applied in the military environment and reveals the perspective on a thinking soldier in the next generation.

Keywords

KM, IT, OS, RMA, K-Army, E-Army

PREAMBLE

"Knowledge is a force to unveil the frontier of unknown"

Abdul Bashah Mat Ali

1.0 INTRODUCTION

The focus of knowledge management is on 'doing the right thing' instead of doing things right', (Yogesh Malhotra, 2001). The emphasize is that that knowledge management provides framework within which the organization views all processes of the activities to sustain the business and/or ensuring the business survival. Within the army organization, there is no difference. The army needs to keep pace with the technology advancement preparing for the increasingly dynamic and unpredictable regional and world environment.

With the objective to be dominant and self-reliance, the Malaysian army has the plan to move toward becoming the knowledge intensive army. This is to ensure the Malaysian army is well equipped and well prepared for the uncertainty with such plan co-inside with the thinking of Alvin and Heidi Toffler (1985) who have forecasted the present as the third or final wave where information plays very important role in the daily activities. For example, they suggested that people could convert knowledge into wealth. The army intents to convert knowledge to 'power', which is proven to be the crucial factor in getting the edge over the enemies. This could help the organization achieve and/or maintain the reputation as the well organized army organization in the region. and, at the same time, ensuring the development of its personnel.

Lt Gen Noonn (2001) believes that the warfare attributes has shifted from the industrial character to a new forum based on knowledge and information. The use of precise surgical strikes on select command and control nodes, strategic facilities, combat resources and combat support facilities in depth have dominated the current warfare. The technologies, information and know-how enable the offensive army in getting at an opponent's nerve controls as happened in precision attacks during the Gulf War. Contrary to the warfare style during the last world war, where Napoleon said the army to march on the stomach, it is crystal clear that today's army goes to war on the basis of advanced technology and classified information gathered. All these have become the main factors that brought about the revolution in the military affairs.

Across the globe, many military organizations have an age-old perspective and tradition concerning knowledge about their organizations, the capabilities (combat/operational effectiveness, logistics state etc.) and the environment in which they must conduct operations (enemy, weather, terrain etc.), (S.G. McIntyre, M. Gauvin and B. Waruszynski, 2003). The Malaysian army realizes such situations and emphasizes on the important of knowledge management. One of the moves, with respect to this issue, is to direct the army development toward revolution in military affairs (RMA). Knowledge management is considered as a very important critical factor that provides timely information to support decision-making, planning and conduct of operations where knowledge resides in people (McIntyre et. al., 2003).

The objective of this paper is twofold. Firstly, to discuss on how knowledge management is applied in the military environment. Secondly, to examine the knowledge management initiatives in the same environment with the discussion on the perspective of the thinking soldier in the next generation.

REVOLUTION IN MILITARY AFFAIRS

During the 20th century, the world has witnessed an unprecedented transformation in international security. The unexpected transition from a bipolar to a unipolar American that

dominates the new world order, following the implosion of the former Soviet Union toward a more 'polycentric' global dispensation and a crucial metamorphosis in the very character of warfare, appears to be unleashing strong forces of strategic fluidity and uncertainty (Col Sonja Johns et.al, 2000).

Whilst the US and its main allies are in the driver seat, the other nations, with different ideology, strategy and belief, race to strengthen their military. The development focuses on the ability to defend themselves from the high technology weapons of the US and the allies, and also to have similar weapons to match the military capability. Although the development of such weapons is under control, the revolution in military affairs (RMA) continues and has become the main agenda in many international forums.

In defining the RMA, the historical phenomenon that have brought about radical innovation and change, which alter the nature of warfare is being referred (see Col John Boyd, 1998). It involves the creation of the modern and effective nation state based on organized military power. The RMA is expected to be a significant event that will bring in the systematic changes in the political, social and cultural arenas, however, is argued to be largely uncontrollable, unpredictable and above all, unforeseeable. The recognition on the importance of the doctrinal and organizational elements has led to the term RMA and other related terminology such as military technical revolution (MTR) becoming popular. However, Eleanor Sloan (2000) offers a different perspective where he views the RMA is part of a series that evolved from the Middle Ages to the present day, enhancing in the 14th century and continuing with increasing frequency up to now.

Throughout history, nations have always pursued innovation to increase relative military effectiveness. It is the acceleration of evolutionary technological change combined with associated operational and organizational transformation that altered the character of war over the last two hundred years. Some of these developments, which progressively shaped the eventual technological metamorphosis ascending, to this chronological order:

- Railways, telegraph, steam-powered naval ironclad and rifle. (Between Napoleonic Wars and American Civil War)
- Change over from wooden sailing ships to steam powered armored hulls. (Latter half of 19th Century)
- Machine gun, aircraft, submarine, main battle tank and armored fighting vehicles. (Prior to World War I)
- Internal combustion engine improved aircraft, radio and radar. (Before World War II)
- Nuclear weapons and ballistic missiles. (World War II and after)
- Information Technology and micro-chip advances, nanotechnology, laser, satellite applications (Latter quarter of 20th century)

However, it needs to be emphasized that even as technological advancement would serve as a prerequisite for RMA, technology by itself cannot provide enhanced cutting edge cost-effectiveness (Owens, 1995). In the blitzkrieg during World War II, for example, which struck a profound change in the very language and grammar of warfare, the Wehermact inflicted a quick shock defeat on a qualitatively comparable, numerically superior force through innovative exploitation of the triad of aircraft, tank and radio. By combining speed, surprise and deception with superior tactical and operational performance, the Germans attained a level of operational superiority to which the allies were unable to adapt in time.

Fitzsimonds and Jan M. Van Tol (1994) suggest that the synergistic effect of common preconditions of technological developments, doctrinal innovation and organizational adaptation alone could enable full realization of RMA.

Fitzsimonds et. al. (1994) stressed that mere invention of new technologies is not enough and these must be developed into practical military systems. For example, in the case of tank, which was introduced at Cambrai in 1917, it was years before the tank was reliable and robust enough to spearhead ground advances, with lots of creativity and innovative skills to harness military technology. The lesson to be learned here is that the success requires not only "technology of the tank and a coherent doctrine of armored warfare but also substantial organization and even cultural changes which got reflected in the new combined arms operations centered on the German Panzer Division" (see Owens, 1995)

In the case of air-force advancement, the victory of the US and its allies in the war against Iraq could doubtless be ascribed to the efficiency, reach and lethality of air power. The air-force has taken a quantum jump through employment of significant force multipliers like Airborne Warning and Control System (AWACS). Joint Surveillance Target Attack Radar System (JSTARS), Joint Tactical Information Distribution system (JTIDS), in-flight refueling, satellite-aided navigation, precision-force technologies etc.

The United States military Air Force has focused on the C4I2 (Command, control, communication, computer, intelligence and information) in its JTIDS for providing single and joint data link network for high capacity information exchange among joint forces through its Space Command program (Lt. Gen. Robert Noonan, 2001). This indicates that the iintelligence gathering techniques are getting revolutionized, with the electronic eyes, ears and blindfolds moving from ground-based platforms to air based ones and finally to space. Detection and deception are the key determinants of success or failure.

Phase array radars, geographical information system (GIS) and towed decoys are the three technologies that make possible the simultaneous monitoring of a great number of tracks and provide a totally unambiguous picture if deception is desired (Lt. Gen. Robert Noonan, 2001). A great quantum of strategic literature has emerged in recent years on the possible emergence of a new RMA that will lead to over-arching changes in the nature of conventional warfare. Such a revolution may be driven by the rapidly developing technologies of information processing and enhance knowledge management.

According to Owens (1995), without intending to dilute the criticality of doctrinal innovation and organizational adaptability, the impact of information technology on RMA has great potential to alter the attributes of the battle-spaces (in the conventional context). Key to this is the accuracy and timely information, which has always been sought by arm-forces and defense planners throughout history. For example, Gengiz Khan, the Mongol conqueror, was the master of employing horse cavalry in outflanking forays against enemy dispositions for vital information gathering prior to the main offensive (Rangarajan, 1987).

In evolutionary terms the character of war, like all other forms of complex and collective human behavior, always changed gradually. Change-cycles of the industrial age were spread over hundreds of years but the sheer pace of mutation in information technology has compressed change cycles dramatically. The variety and ever expanding capabilities of intelligence gathering machines, and the ability of computers to bring together and distribute massive information stem essentially from the information revolution. In fact, the advent of top-end reconnaissance, surveillance and target acquisition (RSTA) technologies, geographical information system (GIS), satellites for navigation, communication and

surveillance with optronics, synthetic aperture radars (that see through clouds) and sub metre resolution would provide military leaders with startling capabilities to garner highly accurate intelligence information.

To this end, it should be understood that the strength of any army organization does not depend only on the spirit of the army to fight to the end but also on the available assistance, in particular, with regard to the technology advancement and the information available.

For the case of Malaysian army, the top management has directed the military activities, together with the economic and political activities, based on strong foundation of knowledge management and Information Communication Technology (ICT) (Colonel Haji Abd Rani, 2003). With the aim to have a strong army, the Malaysian army has undergone immense development and has reached to the state where the authority believes that this small country has the mechanism to defend the country, the army could be assist maintaining the political stability and, most importantly, does not require outside forces to be deployed in Malaysia (Col Haji Abd Rani, 2003).

All level within the Malaysian army has been made aware that technological changes, know-how and organized and timely information have revolutionized the warfare tactic and strategy in the 21st century. Examples of countries that exploit emerging technologies and synergies the same with innovative operational doctrines and organizational adaptation have achieved far higher levels of relative military effectiveness are being cultivated in the army's mind. The army personnel have been asked to contribute toward the organization technological transformation and related paradigmatic changes.

Based on the above phenomenon, such a defining change warrants a comprehensive transformation of the Malaysian Army into the K-Army. Thus, superb Knowledge Management could facilitate the evolution of RMAs in the Malaysian Army environment where the vision of the Thinking Soldier could be attainable. Moreover, with the move toward properly guided RMA, the Malaysian Army, in the coming years, would be able to play greater and more important role to stay alert to evolving and exploiting emerging technologies so that technological asymmetry can be sustained against competitors and adversaries.

DATA COLLECTION METHOD

The discussion is based on the research work done at the Royal Military Police Corps, Military Police Directorate, Army HQ, MINDEF, Wisma Pertahanan, Jalan Padang Tembak Kuala Lumpur. It is part of the bigger study to examine the transformation process of the corps into a learning organization with the vision of K-army and E-army.

For the purpose of the discussion on the revolution in military affairs towards the thinking soldier, most of the facts are revealed from the series of interviews conducted at the Royal Military Police Corps. The participants include the Director of the Royal Military Police Corps, Colonel Haji Abd Rani bin Ismail, top officers at the departments and various ranks of army personnel.

The questions and agenda of discussions are administered such a way that allow high rank participants to lead the discussions whereas for lower rank personnel, a more structured questions are used. The in-depth interviews actually have revealed extremely valuable data for this write-up.

ANALYSIS AND FINDINGS: KNOWLEDGE MANAGEMENT ENVIRONMENT WITHIN THE CONTEXT OF MILITARY – THE THINKING SOLDIER.

It has been viewed that transformation encompasses capabilities, processes and systems being used today. Within the military context, any transformation affects the whole army (Col. Haji AbdRani,2003). According to Col Rani, the evolution and development of information communication technology (ICT) pertaining to the economy based knowledge have brought the Malaysian army to a new dimension where the new phenomenon demands the military to produce trained, knowledgeable and highly skilled officers as well as personnel in enhancing the defense sector.

"*The knowledge superiority in military operations requires dominant battle space awareness and visualization and as the battlefield and tempo of war change, the pace of information creation and decision-making also multiplies*" (Col Haji Abd Rani, 2003). He stresses that the Malaysian military, in facing the modern warfare, will have to rely on information from various sources that must be assessed and compiled for immediate use. With the timelines becomes shorter the army must be proactive as the modern warfare requires superiority at all levels of command and control. This includes situational awareness tools, for examples, for the superiority on the opponents in anticipating their reactions, for sense making, for problem solving and for superior decision-making.

This is in line with the thinking of Ross Pigeau and Carol McCann (2000) who highlight that the globalization of warfare and the accompanying elements of joint and combined operations are the significant change for modern military conflicts. The warfare and its derivatives of peacemaking and peacekeeping take place on a global stage, far beyond local or regional conflicts. This means that situational awareness and decision-making rely to a greater extent than ever before on sources beyond the immediate theatre. It can be instantaneous and from anywhere in the world.

Pigeau and McCann (2000) also claim that working effectively with joint or combined forces in coalition situations requires the ability to communicate and coordinate operations in a 'seamless' environment. The Malaysian army recognizes that interoperability is essential to joint operational success. Coalition and military joint practices using high technology equipments take place with the neighboring countries. The top management in the Malaysian army recognizes the importance of communication technology and has allocated a significant amount for ICT development. The army believes that with complete infrastructure it can ensure success and also promote learning initiative by bringing together knowledge management and learning organization projects.

On the human resources side, the top management of Malaysian army, thinks like the corporate counterparts, recognizes the important role of intellectual capital toward creating the so-called Knowledge-intensive Soldier (K-Army) or the Thinking Soldier. The notion of K-Army gives an impression that rapid technological advancement means that training must become faster and more effective. Military personnel are rotated through positions for both operational experience and career development. They acquire vast resources of tacit knowledge through their experience.

Focusing on the thinking soldier, the Malaysian army has taken the initiative to move toward becoming the military learning organization. Building and developing people, the best identified resources (Col Haji Abd Rani, 2003), as the new focus the army has designed the personnel career development for the benefits of the personnel as well as for the organization.

The 'thinking soldier' attributes hold not only during services but also after they retire. This is importance as many army personnel have been recorded to leave the service early due to various reasons. The hope is as the 'thinking soldier' they are proud to be in the army and willing to serve the army for longer period. And, if they retire, they are in demand in the corporate world.

The above indicates how serious the Malaysian army is preparing toward the k-army. The unique military environment poses several questions regarding the suitability of knowledge management within the military context. Further discussions highlight the possibility of incorporating knowledge management within the context of Malaysian army.

Knowledge Management in the Context of Malaysian Military

Whilst the military environment is defined to be different from the corporate environment, the concept of knowledge management within both worlds should surely be different. Looking at the definition of knowledge management, which is organization or function driven (Waruszynski, 2001), *'the conscious strategy of putting both tacit and explicit knowledge into action by creating context, infrastructure and learning cycles that enable people to find and use the collective knowledge of the enterprise (APQC, 2000)*. The Malaysian army is found to consider on the same perspective of premises, context, content and pace.

The Malaysian army has the same opinion as McIntyre et. al. (2003) that it is the important to note that knowledge management in the military context requires;

(i) knowledge processes that are robust and reliable within the operational context
(ii) knowledge content and intellectual assets that are focused, precise, reliable, accurate, and with acceptable high recall and precision levels.
(iii) knowledge creation and conversion processes that match harmonically align with the pace of operations.

This is important because whilst corporate knowledge management tools can depend on a more sedentary infrastructure, military operational settings require mobile solutions with corresponding issues of security, bandwidth, robustness and reliability. The content varies as well, often more targeted to the particular operation. Moreover, most corporate situations do not need the comparable, quick reaction time required in conflict situations.

Research and Development in Military

The insight shows that in order to support the knowledge superiority the role of knowledge management in Malaysian military operation should focus on these foci;
(i) Advanced techniques and architectures for more effective sharing of knowledge and knowledge across the enterprise's distributed and heterogeneous knowledge management systems.
(ii) Knowledge modeling, discovery and creation for improved situational awareness through research of processes and human knowledge representation in meaningful and intuitive ways; and
(iii) Visualization and geo-spatial systems for enhanced understanding of spatial- and time-related knowledge in complex environments.

The foci incorporate the cycle components of management, application and people and encompass the components of the military knowledge management definition. This reflects

the importance of research and development across the three foci. Such insight from the Malaysian army is similar to the current military research and development in the US and Europe that illustrate how knowledge management solutions go beyond civilian definition to focus on the components of robustness, content and speed to achieve the superiority standard.

Situational Awareness

Situational awareness has been regarded as very important in the Malaysian military operation. The Malaysian army realizes the increasing complexity of examining the current situation with vast information that requires weeding, filtering, sorting analysis, and synthesis. Information fusion and information management can be and are applied to the problems but without the addition of knowledge conversion processes they can contribute to the information explosion. The top management of the Malaysian army agrees that management of knowledge in such complex environments should enhance the effectiveness of situational awareness systems.

The army believes that interactive picture gives a timely and accurate assessment of all operations within the battlespace and this would enable the decision makers to gain a clear understanding of the current situation on the opposition forces and the environment. This can be done by deploying military knowledge management 'cockpit room' as a command center.

One of the identified contributors to situation awareness is by scanning the environment exhaustively, timely, accurately, and recent information. This can be only possible by having information on line and to be accessed by authorized users. The army believes that secured portal is the obvious solution, so a special taskforce to handle the portal and all IT related activities has established. It is part of the proactive activities toward enhancement of situation awareness amongst the army personnel. There is plan to enhance the existing portal by providing the personnel with a customized, mission and task-oriented knowledge portal that is able to pull together into a suite of work-oriented portfolios, mission specific content, operational task management and knowledge sharing and creation capabilities. The target portal will provide contextual assistance, federated access to a variety of multi-media information sources, arbitrary navigation, contextual searches and semantic connections on any sources and products. It will take into account individual interests and group constraints within dynamic and evolving task contexts, and allow for enhanced collaboration, virtual teamwork, publishing and notification.

The utility of this knowledge tool could be demonstrated in situations that require swift reactions to surprising events, such as an unanticipated epidemic crisis where troops are deployed. The portal could provide diverse background information and analysis, such as alert to threats, predeployment documents, risk analysis, vaccine sources, transport mechanisms, schedules and courses of actions tools. This information is to be presented in various logical views and ready to comprehend for fast decision.

Military Intelligence

Military intelligence is one of the most important forces in any army organizations. The Malaysian army is in the opinion that battlefield intelligence requires knowledge management to "determine enemy or potential enemy force composition, position, capabilities and intentions; while reducing the potential for strategic, operational, tactical, or technological surprise'. Key to these activities is obviously management of knowledge in the army.

The Malaysian military intelligent gives attention to knowledge management in the context of the intelligence activities- obtaining, assembling and evaluating information, converting it into intelligence and disseminating it. For the phase of **direction**, commanders determine the requirements and then communicate them to staffs who in turn collect existing material and request collection from other sources. In the phase **collection**, reconnaissance and surveillance data is gathered by sources and agencies followed by the third phase **processing** which involves collation, evaluation, analysis, integration and assessment of the gathered information. This phase is the conversion of information into intelligence. In the final phase **dissemination**, intelligence is distributed to those who require it. All these activities require timely and accurate information where systematic knowledge management is applied and becomes the advantage to the army. Advanced technologies significantly enhance the processes by providing a commander with more effective battlefield visualization.

The Malaysian Army, thus, capitalizes on advanced technologies in enhancing the intelligence production capability. It is through the integration of mature and emerging information technologies supporting collection management, storage and retrieval, information fusion, data mining, knowledge discovery, visualization and dissemination activities into an advanced demonstrator. In fact, it is observed that knowledge management is repeatedly being claimed to have significant influence in implementing the concepts, doctrine and capabilities of the future Malaysian military command and control.

Interoperability

Within the Malaysian military environment, due to various sectors within the organization, the interoperability of system and units is crucial to ensure all sectors operate effectively together. The operation involves high knowledge content and complex content management. This is identified as one of the drivers for knowledge management in the Malaysian army environment.

Interoperability in the military refers to the ability to exchange services across the sector requires robust systems that are to work in real-time environments. Thus, knowledge systems architecture is designed for mutual comprehension, and effective information and knowledge sharing. The Malaysian army is in the opinion that this enables knowledge creation and workflow integration across distributed and heterogeneous information systems. And, this requires a common OS (Operating System) or common platform to assist the interoperability across sectors.

However, the Malaysian army does not operate using common operating system. It is part of the plan to have a unique and indigenous operating system. This is to ensure interoperability as well as to ensure on the confidentiality or the security of the army activities.

Training and Exercise

Training and exercise is identified as one of the important activities in the army that require different environment and where new technologies of additional capabilities are tested. Insight shows that systems used are used during training, not in the real operation or war, and being replaced with more advance and complex system when needed. Reasons for replacement always related to the requirement of operation that is technological dependent and thus must be up-to-date.

This is in the form of revisualization of the lesson learned from previous exercises, tasks, operations and even wars. These lessons learned is then transformed into training material or

module using simulation, strategic defense game, or any other visual forms that allow trainee gaining previous experiences with the aids of IT.

This includes the initiative to facilitate lessons-learned creation and sharing. Besides the training centers, the establishment of the Malaysian Army Lessons Learned Center does it with the interactive lessons. This is where the thinking soldiers are to be produced.

CONCLUSION

Within the context of Malaysian army, knowledge management is found to be nominating the thinking of the top management personnel. Although the implementation of knowledge management within this organization is not at the fullest level, the vision of thinking soldier reflects the strategic approach of the army and knowledge management to play valuable role in leveraging existing knowledge and converting it into action.

The army is fully aware that the knowledge principle and technique affect both organization and the army personnel. It affects how new military technologies being employed for knowledge advantage and how Malaysian army doctrine to evolve. Knowledge management is being identified as single most important contributor to meeting the challenges encountered during the 21st century's first RMA, and to have a profound influence in the doctrinal shift anticipated by the RMA.

It is clear that within the context of military the main producer for 'power' is information and technology. It is no longer based on the number of soldiers. To measure the strength, the number of army has become secondary to the technology and knowledge superiority.

For future undertaking, it is important to examine how knowledge is being valued by the lower rank of army personnel. Whilst the top management recognizes the value of having knowledgeable personnel on their staffs as the asset and importance of managing knowledge, the lower rank army must also play their role. This would give the complete perception from the army organization on this matter and enhancing the productivity in the organization.

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