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DECISION-MAKING IN CLOSED SYSTEM ENVIRONMENT ON THE BASE OF RISK DETERMINATION, LIKE A PART OF LOGISTICAL LEADERSHIP

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One of the most typical representatives of closed systems is the military system. Furthermore, the military decision-making process is based on standard procedures that from the one side make the process more simple and achievable, but from the other side – dogmatic and too structured, so necessity of changing it to more flexible and based on considerable achievements in logistic, leadership, telematics and computing sciences – became obvious. The historic fact is, that logistic as such is the result and consequence of ancient development of the theory of war or in other words – military science. Thus, looking at development of logistic up to scientific acknowledgment, it is the time to recognize that the modern logistic is not only some transportation and delivering services providing system, which need to be managed, but it is also separate self-regulating management, development, information and analyses system, that can be again obtained like the “Art of manoeuvring of troops” (Theoretist of French military science Jominie, XIX century, CE). The idea is to introduce Logistical Leadership (not equal to Logistical or Logistics management) like an administration system based on logistical science achievements that cross-integrates self-management, self-development, information analysis and decision-making processes and provides the profit of the most qualitative decisions in any applying area.

The main component of any management system is the decision-maker. More explicitly – his/her ability to understand the interaction of all three components of decision-making triangle is situation, resources (available tools), and human’s/decision-maker’s potentials. The hypothesis that the first two elements have no influence from the decision maker’s side before a decision is made and a relative action taken concentrates our attention on the third one – a human. That approach has to be based not only on a creatively thinking individual, but also on scientifically approved methods of situation evaluation and risk analysis that have to be taken in use. Subsequently, we are finding ourselves in front of the task to create and optimise necessary tools and mathematic models that will allow to make correct choice of experts and to conduct qualitative analysis of information and risks, resulting with the most profitable, effective and faultless decisions – the target and the main product of an administration’s system – Logistical Leadership.

Keywords: logistic management, decision-making, standard procedures, risk management

1. Introduction

In year 2005 in connection with Ottawa agreement The Denmark Cost directorate (Kystdirektoratet) initiated process of cleaning the soil from hazardous objects remaining from WW2 at the western coastline of Denmark. The operation took place already in 2006 and many different agencies have been involved. But at the beginning it was unclear - whom, how, how deep, what area, etc. has to be cleaned, because there were neither procedures nor experience to organize such a difficult operation – full profile demining at coastline. New supply roads and transportation issues, entrances and exits from demining and demolition areas, security zone and passing procedures (including air space and maritime areas connected to the field of operation), scientifically approved methods of demining and calculations of 3D area needed to be cleaned with given probability of clearance, etc. – those are the problems that organizers met. Now, looking into available documentation, there is no doubt that to solve these problems, in reality managers of operation used more or less principles of logistics. It is the fact that Logistics is one of the results of development of the ancient theory of war and is probably most developed and attractive management system in present, which can serve like a foundation for future development of universal administration system – Logistical Leadership. In this connection It is more-less understandable reason to choose “logistics” like a part of administration system, but why “Leadership”?

Speaking about any administration system we can not avoid the central figure of it – human. Managers, administrators, directors, chiefs, etc. – all of them are greater or less leaders. Each and all of them are on key positions that give access to information and situation analyses; – to distribution of priorities and resources; -to creation of plans and control of its’ realization; – etc., but all those activities will sooner or later result with a decision, in particular those are the parts of one common process - decision-making. The decision-making is the process where many specialists take a part in. At the same time it is the process which needs to be organized, coordinated, administrated, managed etc. and not list –

leaded because at the end it will be often only the leader responsibility about quality of such decision-making and finally about decision he/her will made.

In closed system environments, like a military system, the decision-making will ask even more responsibility from decision maker – first and foremost because of safety and security aspects - respectively because of necessity to identify and to evaluate all the risks most possible accurately. Speaking about risk the most common definition of it is “lose” decision-making in condition of direct threat to one’s life makes identification and determination of risks to the most important part of the decision-making. Unfortunately the military forces are almost everywhere and every time under pressure of such conditions that is why evaluation of different risks has to become a non-separable part of military decision-making. That is why it’s very crucial to recognize all elements of such decision; to involve the most trustable experts; to determine all possible problems and risks most accurately.

Risk determination in safety and security areas is not the same like in others areas, primary, once again, because of concentration on the possible threats to human life as such, then because of uncountable number of combinations of uncertainties, so because of impossibility to collect suitable statistic information for conducting pure mathematic analysis. The only method available in such conditions is use of experts, or education of future decision makers like experts in safety and security at the same time. Under circumstances of emergent necessity there is possibility to conduct qualitative risk determination, by use of specially created methodology for selection of experts, and compatible evaluation of results of expertise made by them. Creation of mathematical model and mathematical calculation of all necessary products of expert and/or expertise quality is an additional task and possibility of automatization of some decision-making processes – in this aspect logistical leadership system creation where computing can help effectively.

2. Logistical Leadership – Substantiation and Formulation

“*Logistic* is the process of planning, implementing and controlling the efficient, effective flow and storage of goods, services and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements” – formulation that Council of Logistic agreed on. Taking in account this standard formulation of logistics the two main areas of modern logistics can be identified:

Practical logistic – practical realization of definition, and

Logistics Science – scientific approach to the methods and mathematic models of distribution management (new science, has been actively developed since 80).

This is the statement that some authors insist on, but from my point of view (and point of view of reconstruction/ utilization of logistics like a basement of Logistical Leadership system), firstly – has to be turned bottom-up and formulated like primer – logistic science and then – practical implementation; and secondly – has to be seen only with interferences between and feed bucks from/to both of parts.

Agreed on that practical implementation of Logistical Science achievements is a subordinate process, which is an integral part of Logistics Science and will have “buck up” influence on it, but is not a leading substance of Logistics, we concentrate us on Logistical Science that accordingly spans numerous areas of modern logistics like:

- Raw material acquisition and supply management
- Production management
- Marketing
- Transportation, delivering and distribution management
- Information management and analysis
- Personal management
- Risk management

Each of these areas based on the main principles of Logistics management:

- Strategic positioning and support policy
- Continuity
- Cyclicity
- Functional interdependence
- Flexibility
- Cost-effectiveness
- Competence building and follow of technological development
- Rationalisms
- Integrity

But from my point of view the expression “logistics (or logistical) management” may be analysed with an adequate criticism. If the formulation of logistics like a process of planning implementing and controlling... etc. – is the correct one we are agreed about so Logistics itself is the management system. Thus logistics management can be obtained like a bit confusing formula – management of management, although in some sources it’s formulated like “The design and administration of systems to control the flow of material, work-in-process and finished inventory to support business unit strategy” – pure tasks of Logistics itself. So to avoid any misinterpretation of such non-sense “management of management” formulation, I’ll utilize the above-described principles like principles of Logistics. Then once again – everyone administration/management system is created by human, utilized by human, and managed/administrated/leaded by human so the human/individual is one integrated (I even must stress – central) part of any such system. And it only depends on human ability if any system will function effectively or not.

“**Leadership** is a process of social influence in which one person can enlist the aid and support of others in the accomplishment of a common task”, by Chemers, M.M. In another source we can find that “Leadership is a process by which a person influences others to accomplish an objective and directs the organization in a way that makes it more cohesive and coherent”.

Transactional and transformational leadership theories describe vertical or horizontal chain of command/relation between individuals in a team solving some given tasks. Identification of the types of leaders gives us the knowledge of imperative division to:

- Autocratic or Authoritarian Leaders, who centralize all the power of decision-making in his/her hands and do not ask for any suggestions or initiatives from subordinates;
- Participative or Democratic Leaders, who prefer “consultations” with team members before giving instruction;
- Laissez Faire or Free Reign Leaders, who actually not lead but motivate team members to use whole the spectrum of they knowledge and experience and provide maximum “freedom of movement”.

So which theory of leadership or what kind of leader type has to be used from the point of view of a closed administration system? In fact different situations ask for different leaders or more precise – different styles of leadership.

The autocratic one can be successful as it provides strong motivation to the manager, permits quick decision-making, although only one person decides and keeps each decision to himself until feels it is needed by the rest of the team. An autocratic leader does not trust subordinates. The democratic one prefers decision-making by the team, because he believes that can win from cooperation between team members and can motivate them effectively and positively. It costs more time and more knowledge from the leader himself. The Laissez Faire leaders do not lead from the point of view of close control to subordinates. They are given a freehand can use they own methods and realize own ideas. It’s possible in team with high level of trust and expertise, but asks from the leader absolute fidelity to subordinates and actually great aptitude in the area of leadership – to create self-regulating decision-making system.

In an emergency when there is no time for discussions to obtain an agreement and where a commanding officer has significantly more experience or expertise than the rest of the team, an autocratic leadership style is the most effective, at the same time, in a highly motivated team with a homogeneous level of expertise, a more democratic (up to laissez faire) style may be more effective. So the leadership style taken in use, while balancing the interests of members of the team, should be passed to current situation and provides most effective way to accomplish tasks or achieve the objectives given.

Why Leadership and not Management?

Through many publications and authors as well as both by theoreticians and by practitioners, the terminology of “management” and “leadership” have, in the context of administration of an organization, been used both as synonyms with clearly differentiated sense – after simplification – supervising, directing and controlling the process of accomplishment of the task. Generally speaking the fact that those two nouns are in used equally well indicates that there is a broad overlap between them. However the noun Leadership in my opinion describes not only involvement in process of management but also of creation of new innovative visions. From this angle I agree with expression that “Good leaders develop through and never ending process of self-study, education, training, and getting new experience”.

Taking in account all above mentioned The meaning of **Logistical Leadership** can be formulated like – **systematical approach to creation, administration and development of interdependent connections across any process to provide the most efficient and coherent planning, implementation and control with aim to accomplish tasks or achieve the objectives most effectively.**

Like it situated before the Logistical Leadership found on base of principles of Logistics, so it is logical consequence that the principles of Logistical leadership formulated similarly:

- Strategic positioning and vision production
- Based on Methodology, Scientific approach and Risk management
- Clear and adequate personal policy
- Cyclicity and Cost-effectiveness
- Flexibility and efficiency
- Functionality and Rationalisms
- Sustainability and Continuity
- Comprehensiveness and Interdependence
- Support and use of already existing resources
- Information exchange, Data collection, and tendency analysis
- Process Integrity

Logistical Leadership \neq Logistics Management

3. Paradigms of Decision-Making in Closed System Environment

An individual is rational and analytic creature lives not only pushed by his/her instincts and feelings, but mostly leaded by his/her intellect. During live cycle we have to take uncounted numbers of decisions. Each person, organization or institution prefers to deal with the less risk affected way of action. There why the possibility to preview or even more to prevent risks, determined by scientifically approved methods, is highly evaluated by decision makers. One decision could be more important than others as well as more qualitative than the others. Decision-making is based on level of education and competency, area of duties, position in society, experience and skills of a decision maker as well as on his/her ability to utilize accessible recourses and taking advantage of modern technology and scientific approach to determination of all obstacles, positives and negatives influences, risks' and human factors.

The earlier military decision-making process has been based on philosophy of war, where two or more opposite sides try to push each other to some stand when one of the sides will have no more possibility to resist and will be physically forced to execute the winner's will. In modern time, when the concern about asymmetric threats is higher then about conventional war, saving the idea of military system like a closed system and centralization of power in military forces, the commanding officer both like leader and like decision-maker has still a privilege to take final decision and distribute orders about when, where, why and how subordinates have to act. But then again, the modern technology, use of "smart arms" and computers created situation when each soldier on the battlefield has to become decision-maker in individual area of responsibility.

- | 10 steps to become 360 degrees leader |
|--|
| 1. Take the tough job |
| 2. Put in your time in the trenches |
| 3. Be comfortable working in obscurity |
| 4. Make an effort to get along with difficult people |
| 5. Put your own reputation on the line |
| 6. Admit your faults, never make excuses |
| 7. Do more than is expected of you |
| 8. Put out your hand and help someone else |
| 9. Never, ever say, "That's not my job" |
| 10. Follow through on your promises |

Figure 1. 360 degrees leader

With the aim to synthesize a new approach for preparation of modern military decision-makers at all levels, the analysis of current situation on different levels of decision-making has been made several times. During conference "Human in command – 2000" among other opinions the idea of 360 degrees leader (Fig.1) was introduced and the question about qualities of military leader has been discussed from many aspects. Everyone was agreed that many abilities (Fig. 2) have to be at present when we speak about commanding officer position as a leader. But no one mentioned the commander duty to be not only a personal manager, system developer etc. but as well a decision-maker at the same time. Even more – no

one stressed the necessity to delegate authority of decision-making through hierarchy of command down to simple soldier, who, as already mentioned, also de-facto becomes decision-maker in the field of his/her military profession and expertise, of individual development and experience.

able	courageous	good humoured	knowledgeable	practical	smart
accountable	creative	heroic	loyal	professional	spirited
action-oriented	decisive	honest	management	resilient	steady
adaptable	dependable	honour	mature	resolute	tough
alert to moral issues	determined	imaginative	moderate	respectful	trusted
analytical	diligent	industrious	moral courage	responsible	trustworthy
can anticipate	dutiful	influential	not shy	ruthless	undaunted
articulate	dynamic	initiative	obstinate	self-confident	unflappable
assured	eloquent	innovative	organizational	self-controlled	valorous
audacious	empowering	inspirational	skill	self-improving	virtuous
audacious	energetic	inspiring	perceptive	selfless	will
brave	expert	integrity	perseverant	self-reflective	will power
competent	fit	intelligent	personal	self-sacrificing	willing to take risk
competitive	flexible	intuitive	integrity	sincere	wise
considerate	force of character	inventive	physical courage		zealous
cool-headed		judgment			

Figure 2. Leader’s abilities

Decision-making in a closed system environment has other properties and more restrictions than in an open system. Usually there is even separate legislation specially created for such system, that from one side protects the system, but from the other side sets frames restricting utilization of closed system advantages. In such conditions it is very important to concentrate resources on system’s qualitative skills.

The fact is that continuing follows the algorithm of soldiers training on the base of physical strength and military tactical skills, the militaries spontaneously more and more look on themselves like on well trained military equipment and weapons’ operators and not just a warrior. In this case the set of different standing orders, regulations, rules, manuals, standards... etc. (generally speaking – standard procedures) does not meet anymore requirements of conducting modern military operations – real asymmetric warfare operations, due to uncounted number of variations of methods and sets of tools that can be used for its’ accomplishment.

So – what kind of paradigms we are discussing about? The differences between human ability to follow “Standard procedures” as a decision-making process simplification – from one side and need for qualitative decision made by a creatively thinking professional – from the other one! Those differences are very simply describable taking as example above mentioned (Fig. 2) “in bold” written qualities. Contrary to qualities of decision-maker, the “standard procedures” ask from a “simple soldiers” to be:

- Non-analytical (take measures – look in database!)
- Non-expert (do what and how I said to do!)
- Non-creative (read manuals!)
- Non-innovative (follow prescriptions!)
- Non-inventive/smart (use standard tools! Don’t has any? Ask for supply!)
- And finally – maybe self-confident, self...etc. but only when following the standard procedures.

As result to de-conflict psychological un-safety and comfortlessness for human boxed between aptitude for creativity (especially for well-educated person), and hard frame of standard procedures (made for purpose of being possibly used even by a monkey), there is a need first and foremost to change way of thinking and level of trust to single worker inside of closed system (soldier). This can be done by gradual implementation of “intellectual approach” methods into training and education system of leaders and also down to simple workers. We have to learn both ourselves and them do not fill any fear of make mistakes but use risk determination and management approach for diminishment of probability of making mistakes instead.

From another side we’ve to destroy conditions which at present support the system of standard procedures. For example, at the moment even our civilian control authorities (our respective ministries) use “Jawboning” to introduce rolls corresponding to peacetime civilian legislation that makes not differences between soldier’s and ordinary worker’s style of life although the first one “selling” his/her life to his country but the second one only his/her hands to employer.

Other areas that need to be reviewed are the following:

- Commander’s responsibility for decisions made by subordinates (avoidance of situation when an incorrect decision made by a professionally trained military person could be a negative case for his/her commanding officer);
- Speculation around high cost of training process for “simple” soldier – that is also the pay for modern technology and live in high-developed society;
- Insurance policy (soldiers a priority is “designed” to be injured or killed in action, so let us don’t be astonished about how it can happened and try to point at this soldier’s own fault in such cases).

Finally, the “intellectual approach” methods shall mean in reality transition from the Standard procedures to methodology. And the simplest solution that can give results already in short-term is to implement two main trains in decision-making:

- Algorithms instead of standard procedures (not a way of doing but way of thinking);
- Manuals – only on the technical level of utilization of equipment or weapons (not “action” or “field” manuals).

4. Risk Determination

The military decision-making process covers decision-making in safety, security and defence areas. It has been always directed to quality of risk determination, for sure much more than in other areas, because here we are speaking about the most dramatic lose – human live.

The quality of such process is essential also because of growing involvement of civilians, who provide different services and necessary support to increase military abilities. Growing activities of CiMiC – the area, where civilian and military efforts have to be coordinated, ask for more attention and more security for civilians, thus for more precise detection, calculation and sequentially following efforts for elimination of possible risks. In such conditions the goal is to develop the new vision on leadership and management in safety, security and defence areas, where the most critical processes could happen because of incorrect situation evaluation, both as the result of ignoring and/or overestimating the possible risks.

From the very beginning it has been a problem to identify what is mentioned by the word “risk”, what this term stands for in safety and security areas. Plenty of definitions started from textual and ending with different formulas have being found (Fig. 2). One common element used in those definitions is “loss”. Taking it as the start point and continuing to range around it as many connected elements as possible almost all corresponding areas have been covered. Taking in account that use of mathematic simulation will ask for clear definition of make-your-choice criteria, the Multi-criteria methods of reconciliation and evaluation of alternatives have been chosen and combined with human ability to percept and analyse information.

- Risk is the unwanted subset of a set of uncertain outcomes.

Cornelius Keating

- Risk is a Combination of the likelihood of an occurrence of a hazardous event or exposure(s) and the severity of injury or ill health that can be caused by the event or exposure(s).

OHSAS 18001:2007

- Risk – the quantifiable likelihood of loss or less-than-expected returns.

Wikipedia

$$\text{Risk} = (\text{probability of event occurring}) \times (\text{impact of event occurring}).$$

$$\text{Risk} = (\text{probability of an accident}) \times (\text{losses per accident}).$$

$$R(\theta, \delta(x)) = \int L(\theta, \delta(x)) f(x|\theta) dx$$

The risk function R of an estimator $\delta(x)$ for a parameter θ , calculated from some observables x , is defined as the expectation value of the loss function L,

Figure 3. Different risk interpretations

The fact that the decision-making process is not fully computerized and following conclusion that frequent involvement of external expert will be needed, as well as analysis of expert selection methods and phenomena of collective (group of experts) decision-making process emphasized the role of quality not only in process of risk detection and evaluation in decision-making but also in methods of selection of the experts involved in the decision-making.

As the result there were two main areas of the process of ensuring the quality of the risk determination by experts identified:

1. Determination and evaluation of the risk – area, which can be gradually formed to three sections:

Identification of alternatives of actions (using Theory of comparisons of alternative):

- Multi-criteria efficiency
- Analytical hierarchy
- Priority of significance

Selection/counting of the risks of alternative (separated by indication of...)

- Independency and self-sustainability
- Interconnectivity
- Multi-influential factors

Risk evaluation by use of:

- Statistic (known information)
- Mathematic (prognosis – unknown information)
- Analysis (known & unknown information + human intuition)

2. Selection of the experts – area, which covers two main interconnected sections, which can be shown separately only for visualization purpose:

Methods of selections of the experts:

- Specific professional competency or Professional variety (depends on object of expertise)
- Social diversity (depends on object of expertise)
- Free recruitment (depends on situation)

Assignment of the qualification of the experts:

- A priori:
 - *documentary (external evaluation)
 - *self-evaluation
 - *cross-evaluation (by other experts in the same group)
- A posteriori:
 - * test.

Finally, with concentration on the idea of ensuring the possible highest quality of such determination, possibly the most efficient way of selection of experts and determination of risks has been found. The quality of such expertise will be logically summarized from mathematically calculated quality of the risk evaluation accordingly estimated from four main elements:

- Risks detection accuracy
- Risk's factors identification
- Risk's factors measurement
- Integrated risk determination.

As well as mathematically calculated Credibility of Experts (group), which also must be estimated through “Assignment of the qualification of the experts” process, where each expert will be evaluated from the point of view of the following:

- Qualification
- Creativity
- Conformism
- Constructivism
- Criticism

- Attitude
- Aptitude
- Interoperability.

As a result of the analysis the algorithm of selection of experts and qualitative risk determination can be prepared for partial computerization of both processes. It can help significantly to create the effective risk determination and consequentially – provide qualitative decision-making.

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