

Theories of Military Science

Lecture Series No. 2

Készült a TÁMOP-4.2.2/B-10/1-2010-0001 „Kockázatok és válaszok a tehetséggondozásban” projekt támogatásával

**An Organic Approach
to Waging War:
Evolutionary Lesson Learned**

by

Lt. Col. Dr. Zoltán Jobbágy

National University of Public Service Press

Budapest

2013

Készült a TÁMOP-4.2.2/B-10/1-2010-0001 „Kockázatok és válaszok a tehetséggondozásban” projekt támogatásával



Contents

Introduction.....	5
Efficiency and Effectiveness	7
Focusing on the Maximum Principle	8
Challenging the Traditional Approach	9
Strategy as Engineering.....	10
Problem of Inflexibility.....	11
Objectives-based Planning	15
Complexity and Confusion	16
Kosovo – A Practical Example.....	18
Objectives Equal Blinders	19
Listing Important Factors	20
Rediscovering Strategic Wisdom.....	22
Emergence and Self-Organisation in War.....	25
Flexibility and Robustness	26
Learning and Adaptation in War	28
Passchendaele as Bad Example	29
War and the Biological Perspective	31
Strategy as Mission	33
Strategy as Rules.....	34
Strategy as Patches	36
Importance of Means.....	37
Conclusion.....	39
References.....	41
About the Author	47

Introduction

This paper is the second issue of a lecture series that was an initiative of the Zrínyi Miklós National Defence University. The recently established National University of Public Service continues with the tradition to introduce various and, on occasion, competing theories of military science to a broader audience. As the title of this paper suggests the author approaches and analyses war from an evolutionary, hence biological perspective. Biological evolution and war certainly share similarities, but to approach the latter in an evolutionary framework requires a shift from mechanics to biology that emphasises dynamics over statics, time-prone over time-free reality, probabilities and chance over determinism, and variation and diversity over uniformity. Although the two phenomena cannot be equated with each other, in an evolutionary framework war can be seen as a complex optimisation problem.

For a transforming large-scale system such as war biology is uniquely appropriate to trace and explain its bewildering attributes as “men and animals successful in the struggle succeed because they happen to be best suited to their surrounding conditions, whether those conditions are simple or complex, high or low.”¹ In this paper the author explores the consequences of this approach in terms of strategy development as seeing war from a biological perspective has far reaching consequences on the way strategy development is approached. Species continuously try to improve their chance for survival for which they chose from two generic mechanisms or strategies such as *adaptive walk* aimed at increasing efficiency or *random jumps* aimed at increasing effectiveness.²

Both strategies refer to two different, but interrelated mechanisms. Similar to the biological evolution of species, the dynamically changing circumstances of war also demands the parallel application of both processes. Whereas efficiency means climbing and proceeds through adjacent neighbourhoods, effectiveness stands for exploring neighbourhoods sampled far away. The exclusion of one process at the expense of the other can result in disadvantages negating the prospect for victory. Thus the strategies applied must always correlate with certain characteristics of war and exactly this will be detailed in this issue of Theories of Military Science Lecture Series.

¹ Ovington, C. O.: *War and Evolution*, The Westminster Review, April 1900, p. 414.

² Modelski, George/Poznanski, Kazimierz: *Evolutionary Paradigms in the Social Sciences*, International Studies Quarterly, Issue 40, 1996, pp. 315-319; Andreski, *Evolution and War*, Science Journal, January 1971, pp. 89-92; For technology-based approach see Armstrong, Robert E./Warner, Jerry B.: *Biology and the Battlefield*, Defense Horizons, Number 25, March 2005.

Efficiency and Effectiveness

Arguments are legion that much of war is non-linear. Consequently, achieving effects always comes as a combination of effectiveness and efficiency. In terms of war efficiency means an emphasis on comprehensiveness and not dynamism. Here every move can be planned in advance and in detail. Flexibility is sacrificed in order to achieve certain predefined objectives or desired effects that make our actions focused, streamlined and unified. This is the domain that makes an exclusive top-down deductive approach attempting to link the strategic and tactical levels of war by means of direct causality possible. Unfortunately, in a constantly changing environment optimisation focusing on narrowing options often does not make sense.

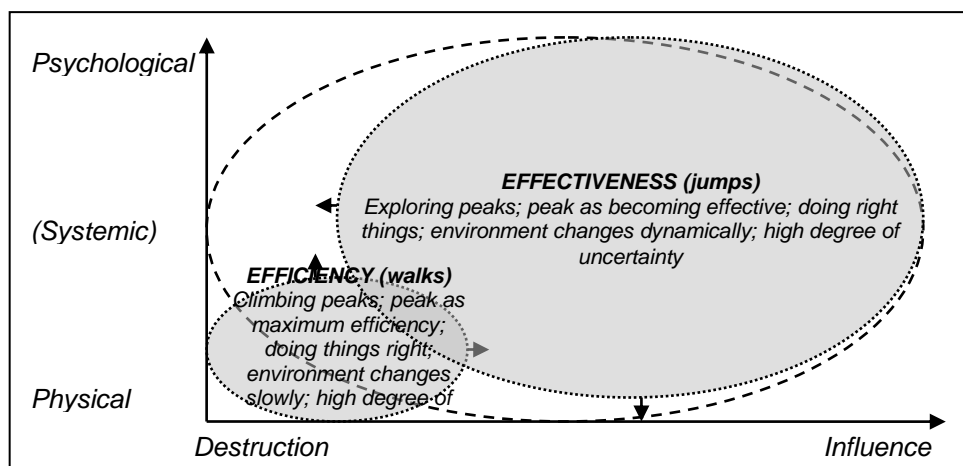


Figure 1: Adaptation in terms of efficiency and effectiveness

In this case it is better to seek exploitable opportunities and to be ready to change and adjust. Instead of relying exclusively on adaptive walks courage is needed to jump right across the landscape to find good peaks. This order is not imposed, but disorder is taken as inevitable. There is a great reliance on bottom-up initiatives based on local information, which is in sharp contrast to the traditional mechanical and deductive approach to strategy development. The two processes, as depicted in Figure 1, can be described by the following principles:

- *Maximum principle* – is an approach that allows for reductionism and stands for efficiency. It assumes that peaks can be defined and solutions come as a result of *engineering* activities. Optimisation and the drive for perfection make sense since it is possible to focus on single dimensions in order to make things better. Planning and execution are the best means to achieve desired effects.

- *Minimum principle* – is an approach that attempts to exploit the power of metaphors and stands for effectiveness. It indicates that peaks have to be found first in order to achieve useful or *good enough* effects. Solutions mostly come as a result of a messy trial-and-error mechanism. Not control, but coping is possible, which emphasise satisfying and acceptance. Here the focus is on relationships and the way they develop over time and space as a result of adaptation and learning.

Focusing on the Maximum Principle

Armed forces put a unilateral emphasis on the maximum principle as they mostly employ a one-dimensional strategy. Strategy is seen as an adaptive walk despite the fact that this process only reveals narrowing options. Thus armed forces attempt to realise predefined objectives at every stage and at every level of war. In order to understand this preference it is important to look at the meaning of the term *strategy* that is defined in normal English as follows:

- The rather general version describes it as the science and art of employing political, economic, psychological, and military resources in order to achieve maximum support to adopted policies.
- The more particular and military oriented version describes strategy as the science and art of military command in order to meet the enemy in combat under advantageous circumstances.³

For Clausewitz strategy meant nothing more than “the use of an engagement for the purpose of the war”.⁴ He lived in an age in which the aim of war equalled with a clearly expressed political purpose. However, this rational causal construct with a clear and concise subdivision of military means to political ends did not hinder Clausewitz to emphasise that in strategy “everything [had] to be guessed at and presumed”.⁵ For him, strategy meant a unifying structure to the entire military activity that decided on the time, place and forces of the enemy with which the battle had to be fought. Consequently, its importance came as a result of “numerous possibilities, each of which [would] have a different effect on the outcome of the engagement.”⁶ The sheer number of possibilities explains why he equated

³ Gove, Philip B. (ed. i. ch.): *Webster’s Third New International Dictionary of the English Language*, Unabridged, Merriam-Webster Inc., 1981, p. 2256; Brodie, Bernard: *Strategy As Science*, World Politics, Volume 1, Number 4, 1949, pp. 475-478.

⁴ Quotation in Clausewitz, Carl von: *On War*, Everyman’s Library, 1993, p. 207.

⁵ Quotation in *ibid.*, p. 211.

⁶ Quotation in *ibid.*, p. 228.

strategy with surprise and argued that “no human characteristic appears so suited to the task of directing and inspiring strategy as the gift of cunning.”⁷

Although Clausewitz regarded the political aim the ultimate goal of war, he equally argued that the multitude of conditions and considerations prohibits its realisation through a single act. As a result, the political end must be decomposed into military means of different importance and purpose. This instrumental focus explains his conviction that “only great tactical successes [could] lead to great strategic ones” and his claim that in strategy “there [was] no such thing as victory”.⁸ Political results on the strategic level could only come from victories fought on the military tactical level. The more the politics on the strategic level is able to exploit military victories gained on the tactical level, the greater the success. This was the very reason for him to claim that in strategy “the significance of an engagement is what really matters”.⁹

Challenging the Traditional Approach

Despite all the merits and contribution of Clausewitz to the theory of war, his efficiency-oriented approach to strategy development appears to be narrow. Being a theorist of the first half of the 19th century he regarded politics as the supreme reason which tamed and canalised the conduct of war. However, his strong influence on Western military thinking resulted that the common understanding of strategy locked in as a link between military means and political ends, or in a more generalised version between cause and its effect. Thus strategy stands for a scheme for making one to produce the other. Consequently, strategy is understood as a plan that expresses clear cause-and-effect relationships for using available military means in order to achieve certain political ends. It provides a rationale for those actions that help realise political goals. Strategy is seen as a rational or planning activity relating means to ends in a focused and rigid manner despite the fact that in most cases strategy might change in case new means become available or different ends appear to be preferable.¹⁰

Non-linearity stands for the brake-down of ends/means rationality. In an inherently non-linear phenomenon such as war, both the formulation of political goals and the application of military means are influenced by the interplay of so many factors that an approach based on rational planning has only limited utility. In these cases strategy does not

⁷ Ibid., pp. 238-239 (quotation p. 238).

⁸ Ibid., pp. 242, 247, 268-271, 434-462 (quotations pp. 270, 434).

⁹ Ibid., pp 617-638 (quotation p. 617).

¹⁰ Betts, Richard K.: *Is Strategy an Illusion?*, International Security, Fall 2000, pp. 5-6; Builder, Carl H.: *The Masks of War, American Military Styles and Strategy and Analysis*, Rand Corporation Research Study, The John Hopkins University Press, 1989, pp. 47-52.

resemble similarity with an elegant forced march, but appears as a messy and painful trial-and-error process in the form of *muddling through*. In the dynamics military means and political ends of the participants can easily become confused. The result is that the means employed and the ends achieved cannot always be delineated sufficiently.¹¹

Strategy as Engineering

Despite the non-linear character of war the traditional military approach to strategy development can best be described as an *engineering* phenomenon. It is seen as rigid model that rests on ends-means calculation in which soldiers attempt to synchronise between ends sought and means applied. A clear definition of ends is followed by a proper organisation of available means for which objectives are set, options narrowed and choices made. Thus strategy is appraised in terms of ends rather than means and assumes deliberate, rational and goal-attaining entities. Goals are articulated as objectives and come as a result of a general consensus. They are assumed to be ultimate, identified, well-defined and sufficiently few to make them both manageable and measurable. The focus is on how well those specific and established objectives are achieved at every level of military operations.¹²

Objectives-based planning emphasises a calculated relationship between ends, ways, and means in which ends represent the objectives sought, means the available resources and ways the concepts that attempt to organise and apply resources in a skilful way. As Clausewitz stated “the subjugation of the enemy is the end, and the destruction of his fighting forces the means.”¹³

$$\textit{Strategy} = \textit{Ends} + \textit{Ways} + \textit{Means}$$

Ends are equivalent to military objectives, ways to military strategic concepts and means to military resources. Strategy focuses on ways in order to employ means to achieve ends. It is a plan of actions in a synchronized and integrated framework that helps achieve various objectives on theatre, national, and/or multinational levels.¹⁴ This framework

¹¹ Mintzberg, Henry/McHugh, Alexandra: *Strategy Formation in an Adhocracy*, Administrative Science Quarterly, 30, 1985, pp. 160-162.

¹² Feld, M. D.: *Information and Authority: The Structure of Military Organization*, American Sociological Review, Volume XXIV, 1959, p. 15; Beinhocker, Eric D.: *On the Origins of Strategies*, The McKinsey Quarterly, Number 4, 1999, p. 53; Robbins, Stephen P.: *Organisation Theory: Structure, Design, And Application*, Prentice-Hall International Editions, 1987, pp. 31-32; Pirnie, Bruce/Gardiner, Sam B.: *An Objectives-Based Approach to Military Campaign Analysis*, RAND MR656-JS, 1996, p. 3.

¹³ Clausewitz, pp. 637, 697 (quotation p. 637).

¹⁴ Dorff, Robert H.: *A Primer in Strategy Development*, p. 11, and Lykke, Arthur F.: *Toward an Understanding of Military Strategy*, pp. 179-180, both in: Cerami, Joseph R./Holcomb, James F. (eds.): *U.S. Army War College Guide to Strategy*, U.S. Army War College, 2001, Internet, accessed 08. 03. 2005, available at <http://permanent.access.gpo.gov/lps11754/00354.pdf>; Department of Defense: *Joint Publication 1-02*,

indicates the military as a self-sufficient system that contains the necessary means both to determine and attain objectives. Planning is seen as a balancing act between the two and supported by two assumptions:

- First, enemy opposition is often regarded as something that falls outside the system. It is seen as an environmental peculiarity that can be overcome. The enemy is simply not allowed to affect clear reasoning, drawing up and pursuit of objectives. War is often subdivided into various headings such as strategy, operations and tactics, and often competence in one area does not mean competence in the other. The military is seen as a rational machine in which decisions are governed by prediction and control.
- Second, high degree of stability and calm is required in order to provide a basis for the rational patterns of orders as the total body of available information is analysed and reduced. War is a series of discrete actions in which events come in a visible and serial sequence. Strict military discipline makes it possible that “nothing occurring in the course of its execution should in any way affect the determination to carry it out.”¹⁵

Problem of Inflexibility

The fundamental design of this approach contains neatly delineated steps with objectives placed at the front end and operational plans at the rear. The process of planning starts normally with setting objectives as quantified goals, followed by the audit stage in which a set of predictions about the future is made. Predictions delineate alternative states for upcoming situations, which are also extended by various checklists. In the subsequent evaluation stage the underlying assumption is that similar to firms that make money by managing money, armed forces can make war by managing war. Several possible strategies are outlined and evaluated in order to select one. The following operationalization stage gives rise to a whole set of different hierarchies, levels and time perspectives. The overall result is a vertical set of plans containing objectives, allocation of resources, diverse sub-strategies and various action programs. The last stage of scheduling is equivalent to the establishment of a programmed timetable in which objectives drive evaluation in a highly formal way as everything is decomposed into distinct and specified elements. The basic assumption is that once the objectives are assembled strategy as an end-product will result.

Dictionary of Military and Associated Terms, 12 April 2001 (as amended through 30 November 2004), p. 509, Internet, accessed 16. 03. 2005, available at www.dtic.mil/doctrine/jel/new_pubs/jp1_02.pdf.

¹⁵ Warden, John A. (Col.): *The Air Campaign, Planning for Combat*, Pergamon-Brassey's International Defense Publishers, 1989, pp. 1-6; Wylie, Joseph C.: *Military Strategy: A General Theory of Power Control*, Naval Institute Press, 1967, pp. 24, 84; Feld, pp. 16-21 (quotation p. 21).

This approach rests on decomposition and formalisation in which strategy development often resembles similarity with mechanical programming.¹⁶

However, due to its linear design this approach can also promote inflexibility through clear directions since it attempts to impose stability. Although everything is built around existing categories emphasising a planned, structured and formalised process, it contains two possible pitfalls:

- First is that it presupposes a predictable course of events and an environment that can be stabilised and controlled. Although even in war it becomes possible to predict certain repetitive patterns, forecasting any sort of discontinuity is practically impossible. Thus a quick reaction outside the formalised design is often better than the extrapolation of current trends and hoping for the best.
- Second is that it concerns formalised processes that often detach thinking from action, strategy from tactics, and formulation from implementation. Formalisation requires hard data in the form of quantifiable measures that are often late, thin, and aggregated. Strategy development is seen as a semi-exact science in which courses of actions are put into dry numbers.¹⁷

In traditional terms strategy is defined by attributes such as “clarity of objective, explicitness of evaluation, a high degree of comprehensiveness of overview, and [...] quantification of values for mathematical analysis.”¹⁸ These characteristics have been further reinforced by the influx of various scientific tools in the form of operations research techniques that attempt to blend the relative predictability of advanced military technology, modern mathematics and rapid data processing tools. Although such techniques make it possible to estimate the probability of hitting a target with a certain confidence, their power soon erodes when facing problems that cannot be easily translated into quantifiable formulas. Undoubtedly, aggregating military activities into measurable data is technically possible, but the subsequent re-aggregation of analytic results is often unsatisfactory even

¹⁶ Mintzberg, H./Ahlstrand, B./Lampel, J.: *Strategy Safari, A Guided Tour Through the Wilds of Strategic Management*, The Free Press, 1998, pp. 48-63; Mintzberg, Henry: *The Rise and Fall of Strategic Planning*, Prentice Hall, 1994, pp. 49-67; Mintzberg, Henry: *The Design School: Reconsidering the Basic Premises of Strategic Management*, *Strategic Management Journal*, Volume 11, 1990, pp. 175-180; Cleland, David I.: *Project Management, Strategic Design and Implementation*, TAB Professional and Reference Books, 1990, pp. 21-36.

¹⁷ Mintzberg et. al. (1998), pp. 64-77; Mintzberg, 1994, pp. 257-267; Robbins, pp. 32-33; Beinhocker, Eric D.: *Robust Adaptive Strategies*, MIT Sloan Management Review, Spring 1999, p. 96; Smalter, Donald J./Ruggles, Rudy L.: *Six Business Lessons from The Pentagon*, Harvard Business Review, March-April 1966, pp. 69-74; Mintzberg (1990), pp. 191-193.

¹⁸ Quotation in Lindblom, Charles E.: *The Science of “Muddling Through”*, *Public Administration Review*, Spring 1959, p. 80.

for the analysts themselves. Consequently, it is at odds with the more complex and constantly changing attributes of war.¹⁹

¹⁹ Millett, Allan R./Murray, Williamson: *Lessons of War*, The National Institute, Winter 1988/89, p. 84; Farjoun, Moshe: *Towards and Organic Perspective on Strategy*, Strategic Management Journal, 2002, pp. 562-563; Mankins, Michael C./Steele, Richard: *Stop Making Plans; Start Making Decisions*, Harvard Business Review, January 2006, pp. 76-80.

Objectives-based Planning

Objectives can best be described as “clearly defined, decisive, and attainable goals towards which every military operation should be directed.”²⁰ The essence of objectives-based planning is that higher-level objectives are decomposed into specific tasks and activities down to the lowest possible level. Thus objectives, tasks and actions are linked hierarchically from top to bottom and across the width and breadth of operations. Clausewitz emphasised that “[n]o one starts a war ... without being clear in his mind what he intends to achieve ... and how he intends to conduct it. The former is its political purpose; the latter its operational objective.”²¹ Objectives-based planning relies on the process of identifying objectives, analysing various courses of actions, and ends with a plan. Activities become linked around common elements, and theoretically everybody can see his or her contribution to the overall effort. Obsolete activities can be filtered out and eliminated, activities and resources elaborated based on substitution and scarcity.²²

Forces are tasked to achieve objectives, which constitute the backbone against which campaigns are planned, executed and assessed in a way that “series of secondary objectives ... serve as means to the attainment of the ultimate goal”.²³ Thus objectives flow from top to down as follows:

- National security objectives form the basis for applying national power in order to secure national goals and interest.
- National military objectives guide the application of military power in various regions of the world.
- Campaign objectives on a regional operational level guide the successful prosecution of military campaigns.
- Military campaigns are again decomposed into operational objectives in order to position and deploy forces.

²⁰ Quotation in *Joint Publication 1-02*, p. 308.

²¹ Quotation in Clausewitz, p. 700.

²² Kent, Glenn A.: *Concepts of Operations: A More Coherent Framework for Defense Planning*, RAND N-2026-AF, 1983; Smalter/Ruggles, p. 64; McCrabb, Maris “Buster” Dr.: *Uncertainty, Expeditionary Air Force and Effects-Based Operations*, Air Force Research Laboratory, 2002b, Internet, accessed 23. 04. 2003, available at www.eps.gov/EPsdata/USAF/Synopses/1142/Reference-Number-PRDA-00-06-IKfPA/uncertaintyandoperationalart.doc; McCrabb, Maris “Buster” Dr.: *Concept of Operations For Effects-Based Operations*, Draft, 2002a, Internet, accessed 03. 03. 2003, available at www.eps.gov/EPsdata/USAF/Synopses/1142/Reference-Number-PRDA-00-06-IKfPA/LatestEBOCONOPS.doc; Department of Defense (2001), p. 381.

²³ Quotation in Clausewitz, p. 228.

- Operational tasks and functions serve to achieve operational objectives.²⁴

Strategy has the basic purpose of linking these levels in a coherent and clear framework since achieving a supported objective is partly a statement of supporting objectives. The result is that objectives cascade downwards as strategy at one level becomes objective at a level below. This hierarchy defines the weight of effort among objectives over time at one level needed to attain a higher level objective in any given situation. Strategy links the hierarchy of objectives and provides the framework for achieving them. At each level objectives and strategies are accompanied by a set of processes and actions defined by various criteria and constraints. This sort of strategy development places a premium on mass information since the execution requires that those involved have access to all relevant aspects. Unfortunately, we demonstrated earlier that due to the frictional, chaotic and complex reality of war information is mostly inaccurate, untimely and incomplete with key pieces missing or hard facts lacking.²⁵

Objectives were well suited to the three traditional levels of war. National security objectives and national military objectives are on the strategic level, expressed in political-military terms and serve as a framework for the conduct of campaigns and major operations on the operational level. Tactical level battles and engagements are fought in order to achieve higher level objectives. Thus objectives at each level are linked to a source or actor within the hierarchy. They proceed from the general towards the particular in a deductive fashion until those actions that help attain higher level objectives are identified. This hierarchical design puts emphasis on vertical relationships despite the fact that some aspects may be well understood and quantifiable, but some more remain uncertain. The broad assumption is that lower-level objectives help attain objectives on a higher level as the output from one objective serves as input for others.²⁶

Complexity and Confusion

Although objectives-based planning presupposes that objectives are defined in a clean and coherent way, there is always a risk that the hierarchical order breaks down. The complexity of war can result in situations in which national military objectives are not articulated in a sufficiently clear and concise way. This hinders the proper articulation of campaign objectives, which again cannot contribute to coherent operational objectives. The

²⁴ Thaler, David E./Shlapak, David A.: *Perspectives on Theater Air Campaign Planning*, RAND MR-515-AF, 1995, pp. 5-7; Kent, Glenn A./Simons, William E.: *A Framework for Enhancing Operational Capabilities*, RAND R-4043-AF, 1991, pp. 10-15.

²⁵ Thaler/Shlapak, pp. 8-12.

²⁶ Pirnie/Gardiner, pp. 3-20.

result is that the entire process shifts towards hedging against the worst case, and ends up with completely inappropriate options. A good example for confusion of this kind was the bombing campaign during Operation Allied Force in which the final campaign plan, with its phased and incremental nature, left the planners mostly confused regarding the effect their actions should have on the enemy. Joint Publications 1-02 defines strategy as the “art and science of developing and employing instruments of national power in a synchronized and integrated fashion to achieve theater, national, and/or multinational objectives”.²⁷

As war proceeds it will be increasingly difficult to identify useful and coherent objectives that can guide military actions. What appears to be desired might change under reconsideration. Although an adequate intelligence support infrastructure is a prerequisite for selecting an appropriate strategy, the feedback loop required for planning, execution and assessment can easily break down. The result is that accurate information does not flow rapidly with consequences ranging from superfluous repetition of actions to dangerous negligence.²⁸ Despite the supposed neat and streamlined design of objectives it is likely that the absence of clear guidance from higher echelons in the form of objectives will increasingly become the rule not the exception. More often, those who should define objectives will be in great need and may demand to get objectives suggested from below. This may pose a crucial challenge in cases in which national- and theatre-level objectives are not well defined or there is no clear causal relationship between military options and desired political results. Due to the complexity involved, the relationship between military means and political ends can either be subject to uncertainties or poorly understood.²⁹

The situation decision-makers might face can become so highly variable and change so rapidly that the entire hierarchical design gets out of balance, and we should never expect definite and well-understood inputs to objectives. The assumed clear policy guidance in the form of objectives can often be ambiguous as various fields may overlap or become contradictory. Furthermore, policy makers often will have to juggle numerous values simultaneously without always making their rank order clear. Consequently, even with this well-structured, engineering-oriented, semi-scientific approach, it becomes impossible to express and describe objectives with the required detail. Another problem is that objectives

²⁷ Polumbo, Harry D. (Col.): *Effects-based Air Campaign Planning: The Diplomatic Way to solve Air Power's Role in the 21st Century*, Air War College, Air University, Air Force Academy, April 2000, pp. 6-24; Quotation in *Joint Publication 1-02*, p. 383.

²⁸ Thaler/Shaplak, pp. 15-22; Lindblom, p. 86.

²⁹ Pascale, p. 88; Lindblom, pp. 82-83.

expressed on the highest level tend to be increasingly abstract. Although they often rely on direct and clear causality, their relevance soon erodes as we move down the hierarchy.³⁰

As a precaution often menus of objectives are suggested to provide a certain baseline for times when the expected guidance from above is either insufficient or unclear. Instead of thinking in a single and rigid plan it is believed that a spectrum of plans forming a pool of various strategic concepts can provide for useful strategies in the case the situation changes, or fails to proceed as assumed originally. However, in terms of the effects landscape that displays war as a complex optimisation problem it is very questionable whether it becomes ever possible to establish a sufficient pool of flexible and non-committal objectives that can cover the vast array of emerging possibilities.³¹

Kosovo – A Practical Example

A good example for practical problems coming from unforeseeable events and confusion can be found in the way NATO's Kosovo Force was deployed in 1999. Despite heavy bombings and the assumption that advancing troops would find demoralised Yugoslav troops, the reality turned out to be different. Yugoslav troops withdrew from the province in a disciplined manner verifying the fact that even if n possible scenarios can be identified, the actual would always be an $n+1$ that could not be foreseen. Although the original mission was to enforce peace and deter the renewal of hostilities, as time passed the mandate emerged more into the civilian sphere and became essentially vague. Despite all efforts prior to the deployment intelligence gathering was poor and soldiers entering Kosovo faced a largely unknown situation. As General Sir Mike Jackson, then commander of Allied Rapid Reaction Corps concluded, in the end the campaign in Kosovo was lucky to be a success as potential enemies largely complied and took no particular actions to upset the plans. Thus he did not feel the need to refer to any sort of excellence in terms of planning and execution.³²

Clear and concise instructions regarding the UÇK were mostly lacking, oral instructions were unclear and not confirmed in writing. Especially in the beginning, local commanders were forced to defuse the situation on a learning-by-doing basis in ad hoc arrangements in the field. Regarding other aspects of the mission KFOR soldiers were also left mostly in the dark as to how law enforcement had to be addressed. Thus they had to fill a vacuum and often had no idea of how to do it. Only five weeks after the first troops entered

³⁰ Thaler/Shaplak, pp. 37-41; Pirnie/Gardiner, pp. 21, 79-83; Pascale, Richard T.: *Surfing the Edge of Chaos*, MIT Sloan Management Review, Spring 2003, p. 91; Betts, p. 13; Richards, Diana: *Is Strategic Decision Making Chaotic?*, Behavioral Science, Volume 35, 1990, pp. 222-224, 232.

³¹ Wylie, p. 84-85.

³² Brocades Zaalberg, Thijs W.: *Soldiers and Civil Power, Supporting or Substituting Civil Authorities in Modern Peace Operations*, Amsterdam University Press, 2006, pp. 289-301.

Kosovo, was General Jackson able to formulate at least his intent in broad terms to guide commanders down to company level and to achieve some sort of unity in KFOR's effort. Unlike the certainties of the Second Wave in general, and the Cold War in particular, it appears that in the Third Wave we will have to learn to embrace rather than eliminate uncertainty.³³ In other words, soldiers have to jump quite a few times until a suitable peak can be identified. This however, means also that assumptions regarding Boyd's famous *observe-orient-decide-act* loop are at least partly flawed. A reversed *act-observe-orient-decide* loop, which first generates options in the form of feedback, might be much closer to reality.

Objectives Equal Blinders

As detailed earlier, strategy development based on objectives can best be described as a maximising approach since it attempts to control everything that may happen on the effects landscape. Despite the discrepancy between the relative rigidity and linear character, and the increasing complexity of situations found in operations world-wide, the temptation to stick to this approach is as strong as ever. This fact also explains why concepts such as effects-based operations caught such a remarkable attention. A planning methodology that emphasises the explicit linking of strategic-level objectives with strategic-level effects in order to achieve objectives in a more coherent and streamlined fashion is tempting for everyone. Traditionalists stick to the objectives-based approach instead of seeing the concept as an opportunity to find new approaches to strategy development.³⁴

The biggest shortcoming of the objectives-based approach is its limited ability to adapt, which is discouraged as much by the articulation of objectives as by the separation between formulation and implementation. Despite the claim of being flexible, the very essence is to realise specific objectives as the focus is on realizing rather than adapting them. Focusing on objectives is quantitative since it mostly deals with static states and not the transitions between possible states. It is a step-wise and incremental approach that proceeds hierarchically through the various levels of war, despite the fact that such links can become weak or even disappear as events unfold. War seen from a biological perspective indicates dynamic and constantly changing co-evolutionary processes, in which events are also influenced by what common wisdom would term external circumstances or luck. It is

³³ Ibid., pp. 302-340.

³⁴ Ho How Hoang, Joshua (Lt. Col.): *Effects-Based Operations Equals to "Shock And Awe"?*, Journal of the Singapore Armed Forces, Volume 30, Number 2, 2004, Internet, accessed 30. 08. 2004, available at http://www.mindef.gov.sg/safti/pointer/back/journals/2004/Vol30_2/7.htm; McCrabb (2001); NATO Strategic Commanders: *Strategic Vision: The Military Challenge*, MC 324/1, as of 12. 01. 2003, p. 15, Internet, accessed 17. 01. 2005, available at <http://www.dmkn.de/1779/ruestung.nsf/cc/WORR-66SFNQ>.

often mentioned that a comprehensive understanding of objectives is needed, which requires that commanders must look at both above and below their respective levels.³⁵

However, such demand can easily put commanders under increased pressure and lower overall performance. Objectives-based planning attempts to see the end from the beginning and by going into ever finer detail it reflects linear causality. War seen as a complex adaptive system indicates that much of the continuum is non-linear and messy, which has serious consequences:

- By going step-wise through the tactical, operational and strategic levels, objectives-based planning suggests that objectives simply add together and war can be seen as a sum, and not the product of many factors.
- Instead of creating options and opening up new possibilities by discovering niches, objectives-based planning shuts down or at least limits the chance of exploiting emergent opportunities.
- In sum, objectives-based planning means that we pursue singular strategies, but do not employ any mechanism that provides for protection things unexpectedly change.³⁶

Listing Important Factors

Clausewitz's contribution to strategic thinking is unquestionable. However, his goal-seeking approach excludes a whole range of other aspects such as logistic, social and technological issues, which must be considered as equally important in military operations. This focus should not come as a surprise since he believed that every human activity is a rational undertaking and governed by reason. This also explains why he understood strategy as an objective-oriented, goal-seeking phenomenon.³⁷

This sort of strategy dominated most of the 20th century and is still dominant today. However, the unpredictability of war indicates clear problems with this sort of strategy image as follows:

- Despite the neat and clean logic behind, planned strategies often resemble gambling. Although they rely on planning and careful evaluation of numerous factors, it is impossible to predict in advance which risk is more reasonable in selecting a

³⁵ Mintzberg, H./Waters J. A.: *Of Strategies, Deliberate and Emergent*, Strategic Management Journal, Volume 6, 1985, pp. 261, 270; Pirnie/Gardiner, pp. 79-83; Senglaub, Michael: *Course of Action Analysis within an Effects-Based Operational Context*, Sandia Report, Sand2001-3497, November 2001, pp. 7-8, Internet, accessed 23. 09. 2004, available at www.infoserve.sandia.gov/cgi-bin/techlib/access.control.pl/2001/013497.pdf; Chakravarthy, Bala: *A New Strategy Framework for Coping with Turbulence*, MIT Sloan Management Review, Winter 1997, p. 77; Lykke (2001), p. 184.

³⁶ Beinhocker (1999a), pp. 100-102.

³⁷ Howard, Michael: *The Forgotten Dimensions of Strategy*, Foreign Affairs, Summer 1979, p. 975; Millett/Murray, p. 84; Ehrenreich, p. 7.

particular course of action. Thus there will always be a certain error in the estimation regarding what we know and what we expect.

- The inherent contingency of war limits the ability to control causes sufficiently well in order to produce desired effects. Friction, chaos and complexity always include the probability of failure since they provide only for an insufficient basis for any estimates regarding odds. Strategic calculation is by definition vague, which also limits the possibility of causing intended effects.
- The personal character of decision-makers often distorts strategy. Thus power is as much applied for manifest political purposes as for subliminal personal ones, which can heavily influence the link between military means and political ends.
- Strategic decisions always go through non-logical filters such as bias and prejudice. Thought processes are influenced by cognitive constraints, which limit the decision-maker's ability to see or calculate linkages between causes and effects in a comprehensive way. Conscious calculations or cognition can often be non-rational as we tend to see what we expect to see.
- Strategies, especially coercive ones aimed at influencing will depend mainly on communication. However, due to cultural blinders the receiver often cannot hear the message sent by the signaller. Logical strategic calculations only have reference within their own cultural context.
- Normal operational friction as outlined by Clausewitz can significantly influence the way plans are executed and decouple assumed causes from expected effects as coercive signals that depend on coupling often collapse.
- Through deflection the process of implementing stated political goals can often be influenced, even resisted, by established organisational routines. Habits and interests can distort the way means are applied with the result that stated goals and objectives become closer to parochial priorities that reflect organisational stability rather than larger political aims.
- Strategy has the purpose of shaping the courses of action that suit policy. Unfortunately, the enemy does not co-operate, but opposes any neat and clean execution of plans. Thus the proper sequence of causes and effects is usually disturbed or reversed and does not unfold according to expectations.
- Opposing preferences also constrain options since they require compromise, which is useful politically, but can be harmful militarily. Political compromises can result in military half-measures that serve no strategic objectives. Such options can be

acceptable to all, but ideal for none since not doing or over-doing is often better than doing something in-between.³⁸

Rediscovering Strategic Wisdom

It is clear that in most cases attempts to realise objectives can become an illusion, although sometimes they might work and under fortuitous circumstances they might even work quite well. As depicted in Figure 2, despite all efforts to plan and conduct carefully designed operations focusing on popular and sterile terms such as *influence* and *control*, the continuum of war does not exclude blunt one-sided conventional attrition campaigns. In other words, brute-force campaigns involving impunity of the stronger can often be equally effective. Asymmetric warfare, complex contingencies, irregular combat fought in urban areas or on difficult terrain always constrain the ability to find and target the enemy and can turn war into a very hard and frustrating process.³⁹

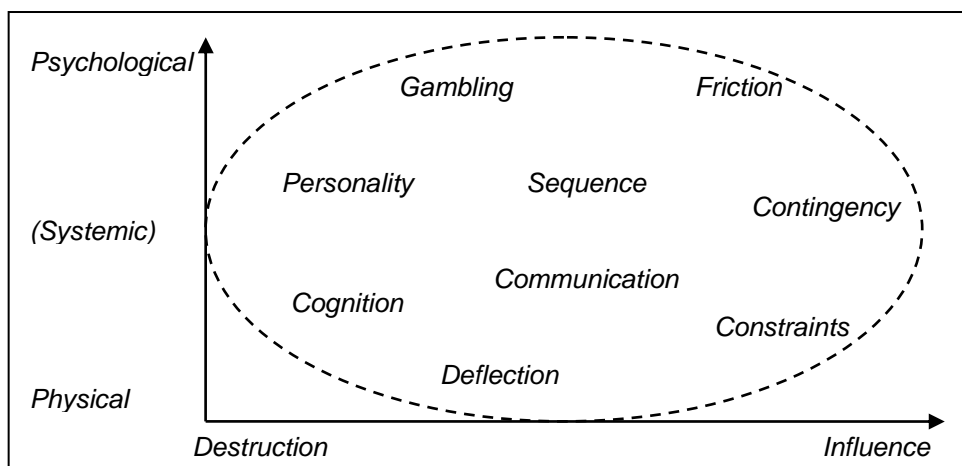


Figure 2: Elements of unpredictability in war

In war the enemy raids, evades, subverts, submerges and withdraws which both confuses carefully selected objectives and desired effects thus negating planned strategies. In a complex environment involving a multitude of players and motives *strategic wisdom* can be more important than any formalisation, which makes strategic success very costly and in some cases impossible. The most difficult and painful aspect of confronting an enemy has traditionally been learning, adapting and embedding the lessons learned into the collective memory of the armed forces. Learning on the battlefield is a nasty business that does not provide for a clear and distinct picture. In the case we stick to the fact that a

³⁸ Betts, pp. 8-40, 43-44.

³⁹ Millett/Murray, pp. 85-93; Grant, Robert M.: *Strategic Planning in a Turbulent Environment: Evidence from the Oil Majors*, Strategic Management Journal, Volume 24, 2003, p. 505.

complex adaptive system stands for polarities to manage rather than problems to solve we must revise the meaning of strategy. Thus strategy development must rest not only on traditional constructs such as plan, implement, and pursue, but also on constructs that emphasise the impact of changing battlefield conditions. Unpredictability of war indicates that the character of the enemy, the threat and the environment constantly change in a difficult-to-comprehend and complex way as the continuum of war displays both linear and non-linear attributes.⁴⁰

No one would say that there is no need for deliberate planning in strategy anymore, but it is important to recognise that taking biological attributes such as *emergence* and *self-organisation* much more into account is of utmost importance. An approach that emphasises exclusively the realisation of clear goals stated in the form of desired effects and demands to “assess ... strengths and weaknesses, plan systematically on schedule, and make the resulting strategies explicit are at best overly general guide-lines, at worst demonstrably misleading precepts to organizations that face a confusing reality.”⁴¹

⁴⁰ Ibid., p. 506.

⁴¹ Quotation in Mintzberg, Henry: *Patterns in Strategy Formation*, Management Science, Volume 24, Number 9, May 1978, p. 948.

Emergence and Self-Organisation in War

In planned top-down strategies objectives have the function to avoid confusion by reducing possible internal tensions as they make things focused, streamlined and quantifiable. However, in war it is difficult to see the end from the beginning. The result is the “unpalatable fact that no one can predict the long-term ... environment with any accuracy.”⁴² Thus in war it is impossible to see the shape the future will take as there is not one predetermined future, but many possible. Although in traditional terms strategy relies mostly on linear cause-and-effect relationships, if the dynamics of war blur temporal and spatial dimensions, such an approach is simply inappropriate. An evolutionary approach to strategy development stands for creativity, constant change, evolving situations and limitations regarding comprehension, prediction and control. Conditions found do not provide for *safe havens* or *free lunch* and any strategy that rests on prediction and planning is marginally helpful at best and downright dangerous at worst.⁴³

Dynamic interactions cannot be engineered and controlled in a mechanistic way. Much depends on chance as possibilities always emerge and form a broad spectrum, with the result that narrow predictions indicate an entirely wrong mind-set for a phenomenon that is inherently unpredictable.⁴⁴ War and biological evolution do not stand for certainties, but remind us that there are only possibilities in the form of options. Consequently, any strategy aimed at harnessing emergence and self-organisation must refocus from prediction and rationality. The various events and activities that influence and determine the course of actions require a different approach.⁴⁵ Thus soldiers are forced to create or track emerging opportunities that can be exploited rather than attempting to realise objectives of a predefined and analytically elaborated plan. An evolutionary approach to strategy development demands qualities such as flexibility, robustness, learning, and adaptation. Although they do not help reducing uncertainty, but help exploit the constantly shifting opportunities it contains.

⁴² Quotation in Williamson, Peter J.: *Strategy as Options on the Future*, MIT Sloan Management Review, Spring 1999, p. 118.

⁴³ Macintosh, Robert/Maclean Donald: *Conditioned Emergence: A Dissipative Structures Approach to Transformation*, Strategic Management Journal, pp. 298-290.

⁴⁴ Pascale, pp. 84-90; Courtney, Hugh/Kirkland, Jane/Vigueri, Patrick: *Strategy Under Uncertainty*, Harvard Business Review, November-December 1997, pp. 66-69; Beinhocker (1999a), p. 96.

⁴⁵ Moncrieff, J.: *Is Strategy Making a Difference?*, Long Range Planning, Volume 32, Number 2, 1999, pp. 273-276.

Flexibility and Robustness

Based on the biological analogy we can address the various revolutions that have taken place in the field of military affairs, technological developments and information processing capabilities all blurring the traditional levels of war and the corresponding boundaries.⁴⁶ In the case of asymmetric and complex challenges the three traditional levels often merge into a single integrated universe in which actions at the lowest level cause dramatic changes that ripple upward simultaneously. Although the attributes of war deny prediction, they appreciate the power of evolution that calls for strategies, which are more robust and adaptive than a traditional strategy with a narrow focus. From a traditional point of view these strategies may not be optimal in every scenario, but they can survive under a wide array of changing circumstances and always keep options open over time. In order to minimise irreversible commitments they refocus from certainty, efficiency and coordination, but offer flexibility and a higher probability of overall success. Bottom-up emergent strategies are powerful enough to account for the uncertainty of the effects landscape and the probability of different potential outcomes. Emergent strategies indicate that selection pressures internally can better address external selection pressures that come from an ever-changing environment. Robust emergent strategies acknowledge that nothing is just *out there* as a separate entity, but is created through a constant co-evolution. Emergence indicates open strategic options and the possibility of various paths that can better contribute to a rapid change of directions as events unfold.⁴⁷

In a complex adaptive system such as war causes and effects are separated in time and space. Focusing on objectives and desired effects means putting on blinders as we normally look either for the most immediate or the most obvious cause. Soldiers have to expect many hidden trigger points that are responsible for the extremely fluid and haphazard conditions, which so often turn confusion into the very essence of war.⁴⁸ Robust and emergent strategies can better address problems in which threats are diffuse, uncertain and unpredictable, and make it increasingly impossible to “skilfully formulate, coordinate, and apply ends, ways, and means”.⁴⁹ This indicates a profound difficulty in foreseeing the course of events since in dynamic and non-linear settings effects do not always directly follow causes. A creative and evolving enemy capable of initiating conditions that are far

⁴⁶ Chakravarthy, p. 69; Quinn, James Brian: *Strategy, Science and Management*, MIT Sloan Management Review, Summer 2002, p. 96.

⁴⁷ Quinn, pp. 96-105; Dent, p. 13; Williamson, p. 118; Luehrman, Timothy A.: *Strategy as Portfolio of Real Options*, Harvard Business Review, September-October 1998, pp. 90-91, 95-96.

⁴⁸ Geus, Arie P. de: *Planning and Learning, At Shell planning means changing minds, not making plans*, Harvard Business Review, March-April 1988, p. 74; Warden (1989), pp. 1-6; Feld, pp. 16-18.

⁴⁹ Beinhocker (1999b), pp. 49-55; Chilcoat, Richard A.: *Strategic Art: The New Discipline for 21st Century Leader*, in Cerami, Joseph R./Holcomb, James F. (eds.).

from equilibrium also defies assumptions regarding clear causality. Dealing with emergent strategies can cause internal tensions that seem to be inefficient as the simultaneous pursuit of contradictory paths runs counter to a traditional understanding. However, they can leverage core skills and assets by creating various options, possibilities and choices. The effects landscape reminds us that it is better to accept conditions of unpredictability and constant change in which strategy is not an exclusive mechanical downstream business, but something that can also emerge. Emergent strategies never assume that a particular input produces a particular output, but indicate probabilistic occurrences within the domain of focus.⁵⁰

Strategy in traditional terms relies on the assumption that the enemy is *known* and *rational*. However, war is full of corrections where the pursuit of objectives on a once-and-for-all basis is mostly impossible and success often comes as a result of actions that respond to changing circumstances. Emergence requires constant adjustments especially in the case of incomplete and changing information. It also indicates that in a dynamic and ever-changing environment such as war a bottom-up inductive approach can often be more helpful than the pursuit of a top-down master plan.⁵¹ Effects in war always interact in a dynamic web of relationships and show all sorts of different and intricate behaviour. Their interactions and couplings often result in conflicting constraints that defy the logical rigor behind assumed cause-and-effect relationships. Although emergent strategies are of little help in predicting the future, they can be a valuable aid in promoting insights into how to become a good evolver. Traditional strategies require clear statements in the form of objectives. The frictional, chaotic and complex reality of war stands for a variety of possible futures in which objectives and desired effects, however clearly and concisely stated, can perform badly. Emergent strategies often conflict and are intrinsically difficult to manage, but the greater the uncertainty, the greater their potential and real value. They do not presuppose the identification of the most or least likely outcome, but cover a broad array of possibilities as they evolve over time with some succeeding and some failing. Thinking about war in terms of a complex adaptive system indicates that victory is less the result of a sustained competitive advantage, but more of a continuous development of learning and adaptation aimed at exploiting temporary advantages. The emphasis is on keeping things that work in order to maintain sufficient variation based on innovation and novelty.⁵²

⁵⁰ Pascale (1999), pp. 84-88, 90, 94.

⁵¹ Wildavsky, Aaron: *If Planning is Everything, Maybe it's Nothing*, Policy Science, Volume 4, 1973, p. 134; Wall, Stephen J./Wall, Shannon R.: *The New Strategists, Creating Leaders at All Levels*, The Free Press, 1995, pp. 4-19.

⁵² Beinhocker (1997), pp. 27-36.

Learning and Adaptation in War

Evolution is full of adjustments that come as a result of learning and adaptation. Both the interactions with the enemy and environmental changes influence strategic options by forcing a certain pattern onto the stream of actions. In other words, the frictional, complex and chaotic nature of war brings any strategy closer to a compromise position. Environmental factors neither pre-empt all choice nor offer unlimited choice. They just limit what the belligerents can do, and with learning and adaptation soldiers acknowledge that messages from the environment cannot be blocked out. Evolution means searching for viable patterns or consistency in order to increase flexibility and responsiveness. Learning and adaptation are especially important if the environment is either too unstable or complex to fully comprehend, or too imposing to buck against. They enable soldiers to respond to an evolving reality properly without focusing on a stable and planned fiction. Consequently, strategic directions must often be discovered empirically through actions that test where the enemy's strengths and weaknesses are. Emergence and self-organisation surrender control to those who have actual and detailed information to shape realistic strategies. As learning and adaptation indicate, it is often more important to respond to an unfolding and ever-changing environment than realise detailed, but inappropriate plans.⁵³

In a complex adaptive system such as war, significant strategic redirections can often originate in little actions and decisions often initiated by "the foot soldier on the firing line, closest to the action."⁵⁴ Learning and adaptation mean that various levels interact and mutually adjust in order to reach consensus. Emergent strategies can arise everywhere. As time passes and interactions with the enemy evolve, some strategies may proliferate often without being recognized or consciously managed as such. Learning and adaptation indicate that strategy development is driven more by external forces and internal needs, than the conscious thoughts of the actors. Emergent strategies break with the traditional understanding of strategy that often relies on the separation of planners and executants.⁵⁵ Learning and adaptation stand for the fact that it is sometimes better to let patterns emerge than impose an artificial consistency prematurely by stating highest level objectives and desired effects, and decomposing them into lower level actions and tasks. Those who are in constant touch with the enemy develop their own patterns that can lead to strategy either spontaneously or gradually over time. In a dynamic and changing environment it is not always possible to predict where strategies emerge or plan for them. They often just pop out as the various patterns proliferate and influence the behaviour at large. Thus strategy is

⁵³ Mintzberg/Waters (1985), pp. 268-272.

⁵⁴ Quotation in Mintzberg, Henry: *Crafting Strategy*, Harvard Business Review, July-August 1987, pp. 70-71.

⁵⁵ Mintzberg et al. (1998), pp. 177-198; Feld, p. 20.

often less the result of a conscious and formal process, but more of collective actions that simply spread through. As they evolve through experiments new directions can be established and exploited, which indicate that it is important to have a climate within which a wide variety of strategies can grow and contribute to a good balance between internal variation and external demand.⁵⁶

Passchendaele as Bad Example

Waging war successfully requires responsibility for engendering change and opening up new possibilities. Rapid and continuous responsiveness coupled to a minimum of organizational momentum emphasises a myopic and disorderly process. Thus learning and adaptation indicate that brilliance often does not come from foresight expressed in a carefully designed plan. War as a complex adaptive system requires the capacity and willingness to learn and adapt, which mostly come from qualities such as tolerance and commitment.⁵⁷ Learning and adaptation stand for trial-and-error and indicate that it is often more important to learn from failures than from success. Although failures are often costly and the temptation to bury and forget is traditionally large, some of the costs can be recouped and a thorough reflection can help hidden shortcomings to surface. Thus it is often better to make a sufficiently good decision in time than to make an excellent decision later, as it is often better to fire more shots than to start improving one's aim.⁵⁸

Murky battlefield lessons must be put into accurate and perceptive after-action reports in which reporting is consistently honest and the bearer of bad news is not punished. Individuals should be afforded the freedom to fail as only through failure is it possible to experience success. Soldiers have to strive for a constant improvement even if everything appears to be well at first sight. As an example Passchendaele was a disaster in World War I because of the "combined effect of the [commander's] tendency to deceive himself; his tendency, therefore, to encourage his subordinates to deceive him; and their loyal' tendency to tell a superior what was likely to coincide with his desires."⁵⁹ Structural inertia often prohibits detecting novel ways that might have the power to replace existing routines, systems and procedures. Emergent strategies assume that those closest to the frontlines know more than the remotely located headquarters, since traditionally "staff

⁵⁶ Mintzberg, H.: *Mintzberg on Management: Inside Our Strange World of Organisations*, The Free Press, 1989, pp. 213-216; Mintzberg et al. (1998), pp. 196-197.

⁵⁷ Mintzberg/McHugh, pp. 191-196.

⁵⁸ McGill, Michael E./Slocum, John W.: *The Smarter Organisation, How to Build a Business that Learns and Adapts to Marketplace Needs*, John Wiley & Sons, 1994, pp. 74, 79-81; Kanter, Rosabeth M.: *Strategy as Improvisational Theater*, MIT Sloan Management Review, Winter 2002, p. 81.

⁵⁹ Quotation in Liddel Hart, Basil H.: *Through the Fog of War*, Faber and Faber Ltd., 1938, p. 346.

information eludes comprehension because it is esoteric; line information because it is trivial.”⁶⁰

Learning and adaptation mean looking outside the boundaries of knowledge. Mobilising this knowledge through various forms of interaction is important since it must be ensured that relevant knowledge finds its way to the unit that needs it most.⁶¹ Emergent strategy development might on occasion equal with the conduct of random experiments. However, it always requires the readiness to be exposed to the evolving interactions with the enemy and the willingness to learn from him. An evolutionary approach to strategy development emphasises less rationality and more common sense. It indicates strategic wisdom, which comes less as a result of a formalised intellectual knowledge backed by analytically written reports full with abstracted facts and figures, but stands for personal knowledge that comes from an intimate *sensing* of the situation. Emergent strategies reflect that the frictional, chaotic and complex reality of war forces us to accept surprise and situations of no choice. Thus learning and adaptation mean linking the present with the future through experience, rather than linking the past with the future through analysis.⁶²

⁶⁰ Quotation in Feld, p. 18.

⁶¹ Hamel, Gary: *Strategy as Revolution*, Harvard Business Review, July-August 1996, p. 75; Lampel, Joseph: *Towards the Learning Organization*, in: Mintzberg et al. (1998), pp. 214-215; Millett/Murray p. 89.

⁶² Mintzberg, H.: *Reply to Michael Goold*, California Management Review, Volume 38, Number 4, Summer 1996, pp. 96-97; Mintzberg (1987), p. 74.

War and the Biological Perspective

According to traditional understanding strategy is regarded as cerebral and formal: therefore decomposable into distinct steps and checklists. Objectives emphasise a focused vision, which is mostly elitist and harnesses only a small proportion of the organization's creative potential. Evolutionary strategies emphasise emergence in the form of learning and adaptation, which require peripheral vision in order to detect and take advantage of unfolding opportunities. They indicate that it is insufficient to "preconceive specific strategies, but also to recognize their emergence elsewhere ... and intervene when appropriate."⁶³

Conceptualising war this way requires that soldiers take both options equally into account. By applying the two sorts of strategy development in parallel, soldiers can best exploit war's unpredictable mechanism. Harmonising internal diversity and external demand means that we can both strive towards perfection as indicated by efficiency, and find attractive opportunities for which effectiveness stands for. Whereas the former presupposes unity of perspective and diversity of purpose, as the planners are assumed to be at the top of the organisation and the executants down below, the latter emphasises diversity of perspective and unity of purpose by acknowledging that strategists can also be found deep in the organisation. This however, indicates that influential and important ideas useful for strategy development are distributed widely, reaching even to the peripheries where soldiers are forced to tackle with fewer resources and information, and exposed to factors that often defy ideas coming from the top. In a dynamic and constantly changing environment it is impossible to predict the very places in which useful ideas form; therefore the net must be cast as wide as possible. From a bottom-up perspective the organisation also tends to appear in the form of core competencies rather than a collection of various units and other elements. Integrating both top-down and bottom-up characteristics into strategy development means establishing something like *planned emergence* or *emergent planning*. These contradictory terms emphasise strategy development both as a bottom-up and as a top-down process. Whereas the former enables subordinates to exhibit autonomy and flexibility, the latter secures a certain degree of compliance throughout the organisation in order to avoid fragmentation of resources. In contrast to the traditional exclusive focus, this way it becomes possible that voices are heard and options explored since lack of

⁶³ Mintzberg, Henry/Lampel, Joseph: *Reflecting on the Strategy Process*, MIT Sloan Management Review, Spring 1999, p. 22; Mintzberg (1987), pp. 74-75 (quotation p. 75); Hamel, p. 70.

diversity can lead to dogmas requiring little more than compliance.⁶⁴ This synthesis broadens both our understanding and provides information regarding constraints in terms of causality. Seeing strategy development as a simultaneous top-down and bottom-up process can help rule out unnecessary factors and define how they complement or constrain one another in space and time. It does not mean that soldiers exclude the possibility to achieve psychological effects. It rather indicates that waging war always requires that based on the context, the focus must be as much on destroying the enemy as influencing him. Although this conceptualisation is less ambitious, it better takes the frictional, chaotic, and complex reality of war into account.⁶⁵

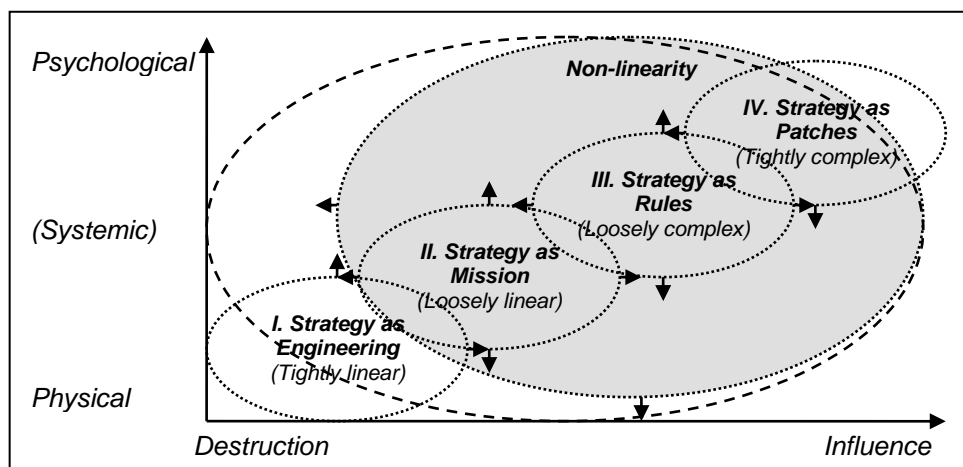


Figure 3: The four various approaches to strategy development

In order to detail the consequences of this approach, three new approaches will be introduced such as *strategy as mission*, *strategy as rules* and *strategy as patches*. They move away from focusing on predefined and static end-states aimed at synchronizing all activities of military forces towards ideas in which diverse elements of an endeavour collaborate simultaneously. The three approaches help soldiers cope with dynamic, uncertain, and high-risk environments in which neither prediction nor planning is fully possible. Thus they are best suited to situations in which traditional approaches cannot cover all cases. As depicted in Figure 3, the more soldiers venture into non-linearity the more they have to expect emergence and self-organisation. Consequently, the more flexibility is required. Whereas the first of the three approaches can be seen as the most known and is familiar for many, the two others can be described as rather novel and thought-provoking.

⁶⁴ Hamel, pp. 76-80; Goold, Michael: *Research Notes and Communications Design, Learning and Planning: A Further Observation on the Design School Debate*, Strategic Management Journal, p. 170; Chakravarthy, p. 80; Grant (2003), pp. 512-515; Wildavsky, pp. 143-144; Wall/Wall, pp. 63-80; Kanter, pp. 76-81.

⁶⁵ Plutynski, Anya: *Explanatory Unification and the Early Synthesis*, British Journal for the Philosophy of Science, Volume 56, 2005, pp. 605-607.

In fashionable terms the first stands for an attempt to *self-synchronise*, the second for an attempt to *de-synchronise*, and the last for an attempt to *a-synchronise*. All three approaches suggest that in case soldiers face uncertainty they should not pull the reins to take more control. Increased complexity means fragmented information and often the best thing we can do is to let things develop. Thus self-synchronisation, de-synchronisation and a-synchronisation stand for fragmented directions, relinquished control and a multitude of possible options. Only this way is it possible to access information and build up a foundation from which we can exploit emergence. Although the approaches rely on different mechanisms, all emphasise the need to make choices based on always limited information, to stop analysing and start acting even in the case of uncertainty, and to learn and adapt that comes from a constant trial and error process. Strategy understood this way makes it possible to become flexible and fluid “able to move one way while responding to local stimuli and changing direction in response to new information from the environment.”⁶⁶ In other words, the biological perspective puts emphasis on people who are able to think as much in terms of how as in terms of what.

Strategy as Mission

The simplest way of finding the winning edge means that strategy combines the higher rhythm generally found at lower levels, with the lower rhythm generally found at higher level resulting in a vertical and horizontal harmony within the organisation. This self-organisation indicates that general or larger efforts on the highest level become synchronised with particular activities conducted at lower levels. Empowerment in the form of responsibility and commitment throughout the organisation makes it possible to achieve a rhythm that does not pull the organisation apart, resulting in chaos or turns it into a rigid monolith. Freedom of action and freedom of execution successfully combine subordinate initiative with superior intent. Whereas the superior’s intent guides as it describes broadly the *what*, the subordinates’ actions realise the intent as best as possible since they stand for the *how*. Consequently, effectiveness expressed by *what* and efficiency expressed by *how* overlap and result in synergy. The process is similar to the notion of evolution since it uses the mechanisms of long jumps and adaptive walks in parallel. Whereas the superior’s intent describes the region in broad terms, the subordinates’ actions aim at finding both path and peak within the region. In case the subordinates discover high peaks within the region, the inherently flexible relationship throughout all levels allows for a quick readjustment. Self-

⁶⁶ Grove, A. S.: *Navigating Strategic Inflection Points*, Business Strategic Review, Volume 8, Number 3, 1997, p. 11-14; Markides, Constantinos C.: *A Dynamic View of Strategy*, MIT Sloan Management Review, Spring 1999, p. 61; Markides, Costas: *Best Practice, Strategy in Turbulent Times*, Internet, accessed 16. 11. 2006, available at www.tiberius.ro/enter/BestPractice/4BestPractice.pdf (quotation *ibid.*).

synchronisation also means that orders are not orders in a linear, classical and rigid way. The subordinates have the right to question the feasibility of the mission if they feel that the superior's ideas are not in accordance with the existing situation or no adequate resources are available. However, after an agreement is reached on what should be achieved the superior has every right to expect the mission to be carried out. This way it becomes possible to minimise a loss of cohesion in the overall effort. Coupling bottom-up initiative with top-down intent enables military organisations to adapt to changing circumstances.⁶⁷

Strategy as mission departs from the requirement that strategy development must capitalise both on elements of deliberate planning, and learning and adaptation. Strategy development comes as the result of a dialectic process "generating both disorder and order that emerges as a changing and expanding universe of mental concepts matched to a changing and expanding universe of observed reality."⁶⁸ This dialectic process enables the organisation to dwell successfully at the edge of chaos facing no clear boundaries, a predictable opponent or a future for which it can plan.

Strategy as Rules

As the situation becomes increasingly non-linear soldiers must further lessen their approach to strategy development in terms of ends/means rationality. Only this way will it become possible to gain an even higher level of flexibility. Complex challenges and asymmetric warfare emphasise simplicity, organisation and proper timing. In other words, nothing is more important than moving quickly, taking advantage of emerging opportunities and rapidly cutting losses.⁶⁹ Asymmetric warfare is extremely fluid in which a simple focus aimed at increasing flexibility is more useful than any overly detailed and difficult-to-revise plan. Although uncertainty is associated with lack of prediction, it also means abundance of opportunities that can be captured, exploited, or dropped should they fail to develop accordingly. Increased flexibility comes from a few critical strategic processes guided by a handful of rules that can define directions without confining them. They delineate only a few parameters within which we try to keep pace with the flow of opportunities. Simple rules enable us to screen and exploit opportunities and allocate resources to areas in which they are the richest.⁷⁰

⁶⁷ Boyd, John: *Patterns of Conflict*, December 1986, Internet, accessed 22. 03. 2005, available at www.d-n-i.net/boyd/pdf/poc.pdf.

⁶⁸ Mintzberg (1987), pp. 69-70; Mintzberg/Waters, pp. 271-272; Quotation in Boyd, John: *Destruction and Creation*, September 3, 1976, Internet, accessed 22. 03. 2005, available at www.belisarius.com/modern_business_strategy/boyd/destruction/destruction_and_creation.htm.

⁶⁹ Wylie, pp. 57-64.

⁷⁰ Brown, Shona L./Eisenhardt, Kathleen M.: *Competing on the Edge, Strategy as Structured Chaos*, Harvard Business School Press, 1998, pp. 32-33; Eisenhardt, Kathleen M.: *Has Strategy Changed?* MIT Sloan

Strategy as rules indicates that similar to guerrillas the organisation itself is *the* strategy as it follows the velocity of emerging, colliding, splitting and declining opportunities. The emphasis points towards mobility, modularity and scale as displayed for example by a Chinese folk rhyme drawn up by Mao and Zhu: “[When the] enemy advances, we withdraw, [When the] enemy rests, we harass, [When the] enemy tires, we attack, [When the] enemy withdraws, we pursue”.⁷¹ A strategy based on simple rules addresses best the nature of asymmetric warfare, which cannot easily be explained by traditional notions since “any form of unstructured raiding qualifies”.⁷² Simple rules stand for constantly evolving strategies that are normally considered unattractive in traditional terms. However, in a dynamic and continuously changing environment a strategy based on simple rules can better seize unanticipated and fleeting opportunities should circumstances change. They not only provide for a *just sufficient* structure, but can also better capture and exploit the best regions in the space of possibilities. Simple rules help us define processes, boundaries, priorities, timing and exit should efforts fail to succeed:

- *Process-rules* – describe the way key features are executed in order to keep everything sufficiently organised to seize emerging of opportunities.
- *Boundary-rules* – help define which opportunities are within or outside our focus. A quick check of such rules helps sort through emerging opportunities as within the boundaries everything that looks promising can be pursued.
- *Priority-rules* – help rank the opportunities accepted in order to allocate precious resources. They help us profit from nascent and highly attractive niches.
- *Timing-rules* – set the rhythm of key processes and help become synchronised with the best opportunities in order to move quickly towards new ones should they emerge.
- *Exit-rules* – make possible to scan emerging, converging or more promising niches and help us pull out from opportunities should they fade.⁷³

Strategy as simple rules does not indicate that objectives are useless, but in a constantly changing environment learning from experience often makes more sense than pursuing predefined objectives that are either inappropriate or cannot be met. Simple rules

Management Review, Winter 2002, pp. 89-91; Grant, Robert M.: *Contemporary Strategy Analysis, Concepts, Techniques, Applications*, Blackwell Publishers, 2002, pp. 516-518.

⁷¹ Quotation in Hammes, Thomas X.: *The Sling and the Stone, On War in the 21st Century*, Zenith Press, 2004, p. 46.

⁷² Luttwak, Edward N.: *Strategy, The Logic of War and Peace*, Revised and Enlarged Edition, The Belknap Press of Harvard University Press, 2001, pp. 152-157 (quotation p. 152).

⁷³ Eisenhardt, Kathleen M./Sull, Donald N.: *Strategy as Simple Rules*, Harvard Business Review, January 2001, pp.107-112.

often grow out of experience and mistakes. They might often exist already in some implicit form until they become explicit, and extend into stated objectives and desired effects. Although simple rules can provide for flexibility, we should never forget that in a dynamic and constantly changing environment such as war, it is impossible to predict how long an advantage lasts.⁷⁴ Due to the frictional, chaotic and complex reality of war it is very difficult to deliver timely, concise and appropriate objectives that can address the continuum of events. Unlike objectives, rules do not focus on static states, but by going better with the flow of events they can help find opportunities more effectively. It is commonplace to state that military operations are often conducted under circumstances in which the amount of available information can become zero. However, even in such cases commanders must provide guidance to subordinates. For this reason three simple rules are often proposed such as “capture the high ground, stay in touch and keep moving”.⁷⁵

Strategy as Patches

Waging war is a hard, conflict-laden task in which many factors interact as the result of internal and external constraints. In the case the amount of constraints is extremely high soldiers face an environment that does not allow for finding good effects. New opportunities can always open up, sometimes converge, occasionally explode or just fade away. Consequently, the match between strategic directions and emerging opportunities constantly falls out of alignment. Finding the optimal solution in the form of desired effects is very difficult. However, conflicting evolutionary strategies are both distinct and modular since they can stand either alone or constantly re-map onto evolving opportunities.⁷⁶

Under such circumstances strategy development resembles similarities with patches in a quilt in which the quilt equates with the environment as a whole, and the patches represent various area. Whereas in the traditional top-down approach strategy is defined by the entire quilt, emergence indicates optimisation first within the patches themselves. Although patches do not overlap, across their boundaries there are couplings in the form of interactions. Due to the underlying dynamism any selfish optimisation deforms the characteristics of other regions. A good solution in one patch might help solve problems in some of the adjacent patches. By means of constant learning and adjustments the patches can eventually gain the right size and settle down exactly on the winning edge poised in the transition between the two extremes, order and chaos. Thinking in terms of patches

⁷⁴ Kathleen/Sull, pp. 112-115; Mintzberg, 1989, pp. 25-42.

⁷⁵ Quotation in Snowden, David: *The Paradox of Story*, Scenario and Strategy Planning, Volume 1, Issue 5, November 1999, p. 19.

⁷⁶ Brown, Shona L./Eisenhardt, Kathleen M.: *Competing on the Edge, Strategy as Structured Chaos*, Harvard Business School Press, 1998, pp. 226-231.

reminds us that whereas a single focused and carefully planned top-down strategy *freezes* into rigid and poor compromise solutions, an exclusively bottom-up emergent strategy *churns* chaotically.⁷⁷

Despite the errors made during the process of selfish optimisation, finding the optimum patch size equals finding the right strategic direction. Finding the right effects and exploiting them comes as a result of mutual and constant adjustments. Aggregate *patchwork* strategies seem to be valuable for two reasons. They make it possible to achieve good compromise solutions under conflicting constraints, and also help track moving peaks very well should the environment change quickly.⁷⁸

Importance of Means

Success in war comes as a result of a phase transition in which the state of war does not settle into a stable equilibrium or fall entirely apart. Thus victory requires a mix of strategies that are rigid enough to organise change, but not too rigid to prevent change. War as a complex adaptive system indicates that often the central challenge in strategy development is to manage change. Soldiers must always be prepared to accept rapid and unpredictable changes that require the emergence of various semi-coherent strategic directions. Friction, chaos and complexity indicate that accepting surprise, making moves, observing the results and continuing with the ones that seem to work are inherent features of war. There is simply too much going on, which does not allow every move to be orchestrated from the top, but often require uncontrolled and parallel actions. Strategy development must happen both at the top at headquarters and below at the front lines. According to traditional measures such an approach means short-term inefficiency based on duplication and misfit. However, addressing the challenges posed by a complex adaptive system requires strategies that are not based exclusively on causal assumptions. They must be built as much by top-level competence as by empowered individuals on lower levels who rely on expanded access to local information. The dynamic interaction with the enemy requires that soldiers eliminate unnecessary constraints. This way they are able to exploit to their advantage the increased uncertainty and complexity that are normally associated with military operations.⁷⁹

⁷⁷ Kaufmann, Stuart A./Macready, William G.: *Technological Evolution and Adaptive Organisations, Ideas from biology may find applications in economics*, Complexity, 1995, pp. 26, 36-41.

⁷⁸ Kaufmann, Stuart A.: *Technology and Evolution, Escaping the Red Queen Effect*, The McKinsey Quarterly, Number 1, 1995b, pp. 127-129; Kaufmann, Stuart A./Lobo, José/Macready, William G.: *Optimal Search on a technology landscape*, Journal of Economic Behaviour & Organization, Volume 43, 2000, pp. 141-143, 162-164.

⁷⁹ Brown/Eisenhardt, pp. 7-15; McGill/Slocum, pp. 85-86.

Success and failure often rest on the shoulders of junior personnel down to the lowest level. By being closest to the events they have to make the right decision at the right time without any direct supervision. This however, requires an atmosphere that promotes agility, information sharing and peer-to-peer relationship in which everyone is empowered to do what makes sense. Thus they need to redefine the individual, the relationship between the individual and others, and between the individual and the organisation. This way it becomes possible to successfully allocate responsibilities and resources. The particularity of time, place and the task, defines who takes charge since empowerment means greater bandwidth of actions including even multi-tasking. Organisations can best take advantage of fleeting opportunities by making the most of available resources. Although such strategies are not optimal for accomplishing pre-defined objectives and desired effects all of the time, they can deliver more innovative solutions to problems at hand at any given time.⁸⁰ Approaching war this way does not mean that there is no longer a distinction between those who lead and those who are led. Leadership will still play an essential role, but “instead of fusing individual into a mass through the suppression of their individuality and the contraction of their thought, the lead ... only has effect, lightning effect, in proportion to the elevation of individuality and the expansion of thought. For collective action it suffices if the mass can be managed; collective growth is only possible through the freedom and enlargement of individual minds. It is not the man, still less the mass, that count; but the many.”⁸¹

Regarding cause-and-effect relationships in war “bad means deform the end, or deflect the course thither”; therefore the only thing left possible is to acknowledge that in complex situations “if we take care of the means the end will take care of itself.”⁸² In a similar fashion also Helmuth von Moltke emphasised that “[i]n war it is often less important what one does than how one does it.”⁸³

⁸⁰ Alberts, David S/Hayes Richard E.: *Power to the Edge, Command and Control in the information Age*, CCRP Publication Series, June 2003, pp. 5-6, 175-177, 179-200, 213-222, 223-231; Krulak, Charles G. (Gen.): *The Strategic Corporal: Leadership in the Three Block War*, Marines Corps Gazette, Volume 83, Number 1, January 1999, Internet, accessed 16. 08. 2005, available at www.au.af.mil/au/awc/awcgate/usmc/strategic_corporal.htm; Fast, William R.: *Knowledge Strategies: Balancing Ends, Ways, and Means in the information Age*, in: Neilson, Robert E. (ed.): *Sun Tzu and Information Warfare, A collection of winning papers from the Sun Tzu Art of War in Information Warfare Competition*, National Defense University Press, 1997.

⁸¹ Quotation in Liddel Hart, p. 356.

⁸² Quotation in Liddel Hart, p. 357.

⁸³ Quotation in Howard, Michael: *The Influence of Clausewitz*, in: Clausewitz, p. 33.

Conclusion

In the paper the author analysed war from a biological perspective. In order to do so he used *On War*, Clausewitz's epic work as background. He made it clear that in traditional terms strategy is seen as a management activity with a clear cut beginning and a definite end.

1) He proved that any sober theory of war must take into account that waging it is an act that has always been more than linking ends with means in a simple deductive fashion, and detecting obvious causality at the strategic level in the form of desired or decisive effects.

2) He demonstrated that although war can be described in general terms using causal relationships, effects that go beyond the immediate spatial and temporal levels cannot be predicted with any accuracy. This indicates that it is possible to only predict some things, especially those that are local to us both in space and time.

3) He detailed that several different futures are possible in war and there is not always time for mechanical, deductive analyses aimed at detecting causality. Thus soldiers should rely on the ability to respond consistently to the unpredictable nature of war.

4) He found that in war soldiers must be satisfied with understanding certain general features in terms of correlation, rather than attempting to discover a mechanism that links causes with effects directly. In contrast, the traditional understanding of strategy rests on exploiting causal relationships.

5) He criticized objectives-based planning and showed that the relationship between ends and means might be clear at the strategic level, but it becomes considerably less clear as specificities emerge, and more ambiguous as the full range of military options expands.

6) He explained that fighting shadowy enemy organisations is the best example of for difficulty to link military means with political ends, and tactical actions with strategic objectives directly in order to identify, penetrate to and destroy the very centres within enemy organisation.

7) He demonstrated that although war might display direct causality, assumptions that rest on equilibrium and a constant environment make up only a small fraction of war's bewildering nature. Consequently, any uncritical attempt aimed at detecting direct causality expressed in the form of desired effects is scarcely more than a fallacy.

8) He proved that rigidity and blind adherence to predefined objectives can result in mounting costs both in terms of money and men. An exclusive focus on the strategic level only narrows exploitable tactical options. Consequently we easily become imprisoned in false hopes chasing desired effects.

9) He explained that being effective and efficient in war at the same time means doing the right things right. This way soldiers can successfully combine the science and the art of war. In other words, as much attention must be paid to the end sought as to the means applied.

10) He concluded that victory in war requires a mix of strategies that are rigid enough to organise change, but not too rigid to prevent change. Instead of focusing on certain desired effects soldiers must be prepared to accept rapid and unpredictable changes that require various and often semi-coherent strategic directions.

Conceptualising war in an evolutionary framework indicates an inherent difficulty when attempting to turn the insights gained into actual policies, programs and strategies. It does not offer clear and simple answers to the way armed forces should train soldiers, write doctrines and develop leaders in the future. The 21st century has just begun and as one contemporary scholar emphasised "it is time to let a hundred schools of thought bloom."⁸⁴ It is the author's hope that approaching war from a biological perspective will be one.

⁸⁴ Quotation in Metz, Stephen: *A Wake for Clausewitz: Toward a Philosophy of 21st-Century Warfare*, Parameters, Winter 1994-95, p. 132.

References

BOOKS/THESES

- [1] **Alberts, David S./Hayes Richard E.:** *Power to the Edge, Command and Control in the information Age*, CCRP Publication Series, June 2003
- [2] **Brocades Zaalberg, Thijs W.:** *Soldiers and Civil Power, Supporting or Substituting Civil Authorities in Modern Peace Operations*, Amsterdam University Press, 2006
- [3] **Brown, Shona L./Eisenhardt, Kathleen M.:** *Competing on the Edge, Strategy as Structured Chaos*, Harvard Business School Press, 1998
- [4] **Builder, Carl H.:** *The Masks of War, American Military Styles and Strategy and Analysis*, Rand Corporation Research Study, The John Hopkins University Press, 1989
- [5] **Cerami, Joseph R./Holcomb, James F. (eds.):** *U.S. Army War College Guide to Strategy*, U.S. Army War College, 2001, Internet, accessed 08. 03. 2005, available at <http://permanent.access.gpo.gov/lps11754/00354.pdf>
- [6] **Clausewitz, Carl von:** *On War*, Everyman's Library, 1993
- [7] **Cleland, David I.:** *Project Management, Strategic Design and Implementation*, TAB Professional and Reference Books, 1990
- [8] **Department of Defense:** *Joint Publication 1-02, Dictionary of Military and Associated Terms*, 12 April 2001 (as amended through 30 November 2004), Internet, accessed 16. 03. 2005, available at www.dtic.mil/doctrine/jel/new_pubs/jp1_02.pdf
- [9] **Gove, Philip B. (ed. i. ch.):** *Webster's Third New International Dictionary of the English Language*, Unabridged, Merriam-Webster Inc., 1981
- [10] **Grant, Robert M.:** *Contemporary Strategy Analysis, Concepts, Techniques, Applications*, Blackwell Publishers, 2002
- [11] **Hammes, Thomas X.:** *The Sling and the Stone, On War in the 21st Century*, Zenith Press, 2004
- [12] **Kent, Glenn A./Simons, William E.:** *A Framework for Enhancing Operational Capabilities*, RAND R-4043-AF, 1991
- [13] **Kent, Glenn A.:** *Concepts of Operations: A More Coherent Framework for Defense Planning*, RAND N-2026-AF, 1983
- [14] **Liddell Hart, Basil H.:** *Through the Fog of War*, Faber and Faber Ltd., 1938
- [15] **Luttwak, Edward N.:** *Strategy, The Logic of War and Peace*, Revised and Enlarged Edition, The Belknap Press of Harvard University Press, 2001
- [16] **McGill, Michael E./Slocum, John W.:** *The Smarter Organisation, How to Build a Business that Learns and Adapts to Marketplace Needs*, John Wiley & Sons, 1994

- [17] **Mintzberg, H./Ahlstrand, B./Lampel, J.:** *Strategy Safari, A Guided Tour Through the Wilds of Strategic Management*, The Free Press, 1998
- [18] **Mintzberg, Henry:** *Mintzberg on Management: Inside Our Strange World of Organisations*, The Free Press, 1989
- [19] **Mintzberg, Henry:** *The Rise and Fall of Strategic Planning*, Prentice Hall, 1994
- [20] **Neilson, Robert E. (ed.):** *Sun Tzu and Information Warfare, A collection of winning papers from the Sun Tzu Art of War in Information Warfare Competition*, National Defense University Press, 1997
- [21] **Pirnie, Bruce/Gardiner, Sam B.:** *An Objectives-Based Approach to Military Campaign Analysis*, RAND MR656-JS, 1996
- [22] **Polumbo, Harry D. (Col.):** *Effects-based Air Campaign Planning: The Diplomatic Way to solve Air Power's Role in the 21st Century*, Air War College, Air University, Air Force Academy, April 2000
- [23] **Robbins, Stephen P.:** *Organization Theory: Structure, Design, and Applications*, Prentice-Hall International Editions, 1987
- [24] **Thaler, David E./Shlapak, David A.:** *Perspectives on Theater Air Campaign Planning*, RAND MR-515-AF, 1995
- [25] **Wall, Stephen J./Wall, Shannon R.:** *The New Strategists, Creating Leaders at All Levels*, The Free Press, 1995
- [26] **Warden, John A. (Col.):** *The Air Campaign, Planning for Combat*, Pergamon-Brassey's International Defense Publishers, 1989
- [27] **Wylie, Joseph C.:** *Military Strategy: A General Theory of Power Control*, Naval Institute Press, 1967

ARTICLES

- [28] **Andreski, Stanislav:** *Evolution and War*, Science Journal, January 1971, pp. 89-92
- [29] **Armstrong, Robert E./Warner, Jerry B.:** *Biology and the Battlefield*, Defense Horizons, Number 25, March 2005
- [30] **Beinhocker, Eric D.:** *On the Origins of Strategies*, The McKinsey Quarterly, Number 4, 1999, pp. 46-57
- [31] **Beinhocker, Eric D.:** *Robust Adaptive Strategies*, MIT Sloan Management Review, Spring 1999, pp. 95-106

- [32] **Betts, Richard K.:** *Is Strategy an Illusion?*, International Security, Fall 2000, pp. 5-50
- [33] **Boyd, John:** *Destruction and Creation*, September 3, 1976, Internet, accessed 22. 03. 2005, available at www.belisarius.com/modern_business_strategy/boyd/destruction/destruction_and_creation.htm
- [34] **Boyd, John:** *Patterns of Conflict*, December 1986, Internet, accessed 22. 03. 2005, available at www.d-n-i.net/boyd/pdf/poc.pdf
- [35] **Brodie, Bernard:** *Strategy As Science*, World Politics, Volume 1, Number 4, 1949, pp. 467-488.
- [36] **Chakravarthy, Bala:** *A New Strategy Framework for Coping with Turbulence*, MIT Sloan Management Review, Winter 1997, p. 69-82
- [37] **Courtney, Hugh/Kirkland, Jane/Vigueri, Patrick:** *Strategy Under Uncertainty*, Harvard Business Review, November-December 1997, pp. 67-79
- [38] **Eisenhardt, Kathleen M./Sull, Donald N.:** *Strategy as Simple Rules*, Harvard Business Review, January 2001, pp.107-116
- [39] **Eisenhardt, Kathleen M.:** *Has Strategy Changed?* MIT Sloan Management Review, Winter 2002, pp. 88-91
- [40] **Farjoun, Moshe:** *Towards and Organic Perspective on Strategy*, Strategic Management Journal, 2002, pp. 561-594
- [41] **Feld, M. D.:** *Information and Authority: The Structure of Military Organization*, American Sociological Review, Volume XXIV, 1959, pp. 15-22
- [42] **Geus, Arie P. de:** *Planning and Learning, At Shell planning means changing minds, not making plans*, Harvard Business Review, March-April 1988, pp. 70-74
- [43] **Goold, Michael:** *Research Notes and Communications Design, Learning and Planning: A Further Observation on the Design School Debate*, Strategic Management Journal, pp. 169-170
- [44] **Grant, Robert M.:** *Strategic Planning in a Turbulent Environment: Evidence from the Oil Majors*, Strategic Management Journal, Volume 24, 2003, pp. 491-517
- [45] **Grove, A. S.:** *Navigating Strategic Inflection Points*, Business Strategic Review, Volume 8, Number 3, 1997, pp. 11-18
- [46] **Hamel, Gary:** *Strategy as Revolution*, Harvard Business Review, July-August 1996, pp. 60-82
- [47] **Ho How Hoang, Joshua (Lt. Col.):** *Effects-Based Operations Equals to "Shock And Awe"?*, Journal of the Singapore Armed Forces, Volume 30, Number 2, 2004, Internet, accessed 30. 08. 2004, available at http://www.mindef.gov.sg/safti/pointer/back/journals/2004/Vol30_2/7.htm

- [48] **Howard, Michael:** *The Forgotten Dimensions of Strategy*, Foreign Affairs, Summer 1979, pp. 975-986
- [49] **Kanter, Rosabeth M.:** *Strategy as Improvisational Theater*, MIT Sloan Management Review, Winter 2002, pp. 76-81
- [50] **Kaufmann, Stuart A./Lobo, José/Macready, William G.:** *Optimal Search on a technology landscape*, Journal of Economic Behaviour & Organization, Volume 43, 2000, pp. 141-166
- [51] **Kaufmann, Stuart A./Macready, William G.:** *Technological Evolution and Adaptive Organisations, Ideas from biology may find applications in economics*, Complexity, 1995, pp. 26-43
- [52] **Kaufmann, Stuart A.:** *Technology and Evolution, Escaping the Red Queen Effect*, The McKinsey Quarterly, Number 1, 1995, pp. 119-129
- [53] **Krulak, Charles G. (Gen.):** *The Strategic Corporal: Leadership in the Three Block War*, Marines Corps Gazette, Volume 83, Number 1, January 1999, Internet, accessed 16. 08. 2005, available at www.au.af.mil/au/awc/awcgate/usmc/strategic_corporal.htm
- [54] **Lindblom, Charles E.:** *The Science of "Muddling Through"*, Public Administration Review, Spring 1959, pp. 79-88
- [55] **Luehrman, Timothy A.:** *Strategy as Portfolio of Real Options*, Harvard Business Review, September-October 1998, pp. 89-99
- [56] **Macintosh, Robert/Maclean, Donald:** *Conditioned Emergence: A Dissipative Structures Approach to Transformation*, Strategic Management Journal, pp. 297-396
- [57] **Mankins, Michael C./Steele, Richard:** *Stop Making Plans; Start Making Decisions*, Harvard Business Review, January 2006, pp. 76-84
- [58] **Markides, Constantinos C.:** *A Dynamic View of Strategy*, MIT Sloan Management Review, Spring 1999, pp. 55-63
- [59] **Markides, Costas:** *Best Practice, Strategy in Turbulent Times*, Internet, accessed 16. 11. 2006, available at www.tiberius.ro/enter/BestPractice/4BestPractice.pdf
- [60] **NATO Strategic Commanders:** *Strategic Vision: The Military Challenge*, MC 324/1, as of 12. 01. 2003, p. 15, Internet, accessed 17. 01. 2005, available at <http://www.dmkn.de/1779/ruestung.nsf/cc/WORR-66SFNQ>
- [61] **McCrabb, Maris "Buster" Dr.:** *Concept of Operations For Effects-Based Operations*, Draft, 2002a, Internet, accessed 03. 03. 2003, available at www.eps.gov/EPsdata/USAF/Synopses/1142/Reference-Number-PRDA-00-06-IKFPA/LatestEBOCONOPS.doc
- [62] **McCrabb, Maris "Buster" Dr.:** *Uncertainty, Expeditionary Air Force and Effects-Based Operations*, Air Force Research Laboratory, 2002b, Internet, accessed 23. 04.

2003, available at www.eps.gov/EPSdata/USAF/Synopses/1142/Reference-Number-PRDA-00-06-IKFP/uncertaintyandoperationalart.doc

- [63] **Metz, Stephen:** *A Wake for Clausewitz: Toward a Philosophy of 21st-Century Warfare*, Parameters, Winter 1994-95, pp. 126-132
- [64] **Millett, Allan R./Murray, Williamson:** *Lessons of War*, The National Institute, Winter 1988/89, pp. 83-95
- [65] **Mintzberg H./Waters J. A.:** *Of Strategies, Deliberate and Emergent*, Strategic Management Journal, Volume 6, 1985, pp. 257-272
- [66] **Mintzberg, Henry:** *Reply to Michael Goold*, California Management Review, Volume 38, Number 4, Summer 1996, pp. 96-99
- [67] **Mintzberg, Henry/Lampel, Joseph:** *Reflecting on the Strategy Process*, MIT Sloan Management Review, Spring 1999, pp. 21-30
- [68] **Mintzberg, Henry/McHugh, Alexandra:** *Strategy Formation in an Adhocracy*, Administrative Science Quarterly, 30, 1985, pp. 160-197
- [69] **Mintzberg, Henry:** *Crafting Strategy*, Harvard Business Review, July-August 1987, pp. 66-75
- [70] **Mintzberg, Henry:** *Patterns in Strategy Formation*, Management Science, Volume 24, Number 9, May 1978, pp. 934-948
- [71] **Mintzberg, Henry:** *The Design School: Reconsidering the Basic Premises of Strategic Management*, Strategic Management Journal, Volume 11, 1990, pp. 171-195
- [72] **Modelski, George/Poznanski, Kazimierz:** *Evolutionary Paradigms in the Social Sciences*, International Studies Quarterly, Issue 40, 1996, pp. 315-319
- [73] **Moncrieff, J.:** *Is Strategy Making a Difference?*, Long Range Planning, Volume 32, Number 2, 1999, pp. 273-276
- [74] **Ovington, C. O.:** *War and Evolution*, The Westminster Review, April 1900, pp. 411-420
- [75] **Pascale, Richard T.:** *Surfing the Edge of Chaos*, MIT Sloan Management Review, Spring 2003, pp. 83-94
- [76] **Plutynski, Anya:** *Explanatory Unification and the Early Synthesis*, British Journal for the Philosophy of Science, Volume 56, 2005, pp. 595-609
- [77] **Quinn, James Brian:** *Strategy, Science and Management*, MIT Sloan Management Review, Summer 2002, p. 96
- [78] **Richards, Diana:** *Is Strategic Decision Making Chaotic?*, Behavioral Science, Volume 35, 1990, pp. 219-232
- [79] **Senglaub, Michael:** *Course of Action Analysis within an Effects-Based Operational Context*, Sandia Report, Sand2001-3497, November 2001, Internet, accessed 23.

09. 2004, available at www.infoserve.sandia.gov/cgi-bin/techlib/access.control.pl/2001/013497.pdf

[80] **Smalter, Donald J./Ruggles, Rudy L.:** *Six Business Lessons from The Pentagon*, Harvard Business Review, March-April 1966, pp. 64-75

[81] **Snowden, David:** *The Paradox of Story*, Scenario and Strategy Planning, Volume 1, Issue 5, November 1999, pp. 16-20

[82] **Wildavsky, Aaron:** *If Planning is Everything, Maybe it's Nothing*, Policy Science, Volume 4, 1973, pp. 127-153

[83] **Williamson, Peter J.:** *Strategy as Options on the Future*, MIT Sloan Management Review, Spring 1999, pp. 117-126

About the Author

Lieutenant-Colonel D. Zoltán Jobbágy is an infantry officer of the Hungarian Defence Forces. After graduating from the Kossuth Lajos Military College in Szentendre he was assigned to the 32nd Guard and Parade Regiment and served as a platoon commander in 1990-92.

Following a successful application to the University of the Bundeswehr he studied Education with a focus on Personnel Management and Adult Education in 1992-1997 in Hamburg, Germany. After returning from abroad he was appointed to the Ministry of Defence where he first worked in the NATO Department and then for two years as assistant to the Deputy State Secretary for Human Policy. He also attained a master's degree in International Relations and Diplomacy from the Budapest Institute of Graduate International Studies at the University of Economic Science in 1997-2000 in Budapest, Hungary. He served as officer in charge of the 1st Hungarian Company working with the United Nations in Cyprus in 2000-2001. After returning to Hungary he was until 2003 senior analysis and planning officer within the Human Policy Department, Ministry of Defence. From 2003 till 2007 he was a researcher at TNO Defence, Security and Safety and associated with the Clingendael Institute in The Hague, the Netherlands. In his subsequent assignment he worked as deputy head of Human Strategy Division, Planning and Co-ordination Department, Ministry of Defence, Hungary. His other tours of duty abroad include an assignment in Sarajevo, Bosnia and Hercegovina, in 2008-2009, where he worked as NATO advisor for personnel management. In 2011-2012 he served as the military assistant to the chief of staff Regional Command North, in Mazar-e Sharif, Afghanistan. In 2013-14 he worked as chief liaison officer at the Operations Command of the Bundeswehr, in Potsdam, Germany.

Lt. Col. Zoltán Jobbágy holds a Ph. D. in Social and Behavioural Science at Leiden University, The Netherlands and a Ph. D. in Military Science at the Zrínyi Miklós National Defence University. Currently he is an associate professor at the National University of Public Service in Budapest, Hungary. His research area is complex adaptive system theory, causality in military operations, analogies between war and biological evolution, and strategy development in dynamic changing environments. Lieutenant-Colonel Jobbágy is happily married to the former Andrea Székely and has two sons, Kristóf and András.