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THE RELEVANT WARRIORS

Leadership and Agility in Complex Environments

INDEPENDENT RESEARCH

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Contents

Abstract

This work explores leadership in complexity through diverse frames of references: an anthropological, evolutionary framework; a contribution from the new science of complexity and chaos; an historical framework; and an intense discussion of practical leadership cases and of their connections to the concepts explored. The convergence of these approaches leads to practical applications: two complementary models informing leadership and organizational functions. The integration effort of this work is multidisciplinary in nature, an approach integral to the culture we deem necessary to stay, or become, relevant in our times.

The discussion of leadership and evolution bears some important implications for the effectiveness of the collective action. The first one is that we are deeply social animals, tailored for small group interaction. An examination of the social needs and behaviors we inherit from our ancestors coincides in an amazing way with the principles advocated by leadership studies, defined through observational and empirical data.

The second implication is that our brain is made for a much simpler world: the hunting-gathering one of our Paleolithic predecessors. However, our world is today hugely more complex and rapidly changing than that one in which we evolved. This creates a gap between our inherited narrowly focusing mind and the complexity we have to confront. A discussion of "broadening trends" to pursue is offered, with the intent of upgrading our capability to comprehend and act in complex environments.

Discussing complexity has led to consider whether the new science of complexity and chaos could contribute to leadership. Complex systems of any kind, including human communities, display some similar characteristics: shaping form and content of the communication flow according to the leadership principles we draw from our evolutionary

history pushes the organization toward the decentralized, self-organizing and adaptive mode we found the most effective in nature. Communication, in its wider sense, is the key strategic enabler, together with a second one: intellectual humbleness. The extreme difficulty to predict outcomes in complex systems makes approaching complex problems with a linear logic a recipe for failure. To influence outcomes, we need to operate on a "statistical basis", choosing a coherent and multidimensional system of inputs to influence our environment. Our systems of inputs should continuously seek to seed opportunities, while we keep ready to seize them whenever they arise, and operate to mitigate risks, focusing on relationships (communication) within the system

A third frame of reference comes from a short, documented journey through history, which shows an extraordinary coherence with the concepts emerging from the previous two frameworks. Different outcomes in the effectiveness of the collective action can be clearly retraced to the different leadership system they were influenced by. Wherever culture and behaviors were mainly based on decentralized, horizontal, empowered social and economic relations, and on a fair and informing leadership, collective action is highly effective; not so otherwise. So, aligning culture with our nature yields the best results for our collective action.

These three theoretical frameworks were tightly intertwined throughout our work with a discussion of practical cases. The fourth frame of reference, experience, interacts nicely with the other ones; the concepts emerging from that interaction are then used to define and refine leadership applications, aimed to succeeding in the complex environment. The first, a tool for leaders, is the *Comprehending-Acting-Leading Loop*. The loop is driven by the organization Mission, Vision and Strategy, and it is meant to guide in pursuing the "big picture"; always promoting a proactive approach and maintaining a high perceptiveness to "weak signals". It asks

for a timely divergent/convergent decision making process and focuses on disciplined execution and simultaneous communication in the implementation phase, to eventually re-evaluate both actions and decisional process. Eventually, the *CAL Loop* is meant to be taught since the beginning of leaders' education, to prime broad, systematic and creative thinking in our young leaders-to-be, and allow common language and understanding at all leadership levels of the organization.

The broader methodology is *The C2PS (Confronting Complexity Proactively and Systematically) Model*. It uses the *CAL Loop* as its "engine" at all leadership levels to influence and orient a diffused, decentralized system of *CAL Loops* at all the organization' echelons, through an intense and reciprocal communication flow throughout the organization. The *C2PS Model* also integrates the conceptual foundations we discussed through our frames of reference and throughout our work together with the *CAL Loop*, and brings them to bear on the organization's main elements: Leadership, Culture, Process and Structure, through a synthetic matrix highlighting some guidelines to shape the organization toward an agile, decentralized, delayered, adaptive and proactive team of teams, tailored for complex environments. The approach proposed, both theoretical and practical, can support leadership and organizational change, as it is the experience and the understanding of the authors, and help to stay relevant in our volatile, uncertain, complex, ambiguous and rapidly changing world.

Prologue

Brigadier General Fernando Giancotti: *"I was eleven when I watched a TV series about the Odyssey. The historic setting was very well reproduced, and I was fascinated by the life of those people: they were so similar to us in emotions and many actions, and so different at the same time, for their strange dresses, tools, habits and their contact with the unspoiled nature of the Mediterranean, over three thousand years before me. That child's fascination has taken me to look for what had been before those mythic times, from our history to the origin of man, and of our universe. Growing, that interest in the early man expanded in several fields of inquiry, and merged unexpectedly, pushed by everyday experiences in my military career, with reflections about leadership and the complexities of human interaction. Ulysses is the father of the "strange attraction" between the roots of leadership and our remote past you will find in this paper. Not only for this, he is still one of my few reference figures."*

Colonel Yakov Shaharabani: *It was in late April 2004 that I received that phone call. On the other side of the line was the new Chief of the Israeli Air Force (IAF). He asked me to lead a team tasked to investigate how relevant and adaptive the Air-Force was and then, to recommend of different ways to improve its relevance, flexibility and adaptability. Those were the days of the "Second Intifada" -- a tough and complex Low Intensity Conflict (LIC) with the Palestinian terrorists. The IAF already adapted very effectively its tactics, training and weapons to confront the new challenges and had become an important component in this conflict; this phone call happened, nevertheless, because of both the organization culture of the IAF and its leadership style, which strongly emphasize the need for continuous improvements. A group of diverse leaders and experts took part and contributed to the tasked team. The brainstorming we had, initiated a quiet strive to observe and understand flexibility, relevance, adaptability as well as their tight connections to leadership. Implementing these observations in my own real-time leadership experience, and at the same time, forming intuitive leadership experiences into logical understanding and methods, turned into my intellectual challenge, practical and useful tools, and…an endless journey."*

Foreword

This work comes together because of serendipity, namely because of carpooling. Two military officers from very different contexts, one coming from a long peace and a second tier garrison nation in Europe's Cold War, the other one from a long, localized conflict at his doorsteps in the Middle East, find themselves converging in the Washington D.C. traffic toward an amazing commonality of perspectives, brewed from different experiences and reflections and aimed at today's world new pressures and demands. They bring a diverse but complementary and mutually reinforcing set of ideas, concepts and practical applications that interlock into a system to confront the timeless challenge of the effectiveness of our collective action in a most demanding environment: the 21st century. This work comes together because this convergence in itself suggests a deeper meaning and makes it worth exploring to prove its substance. Also, it does so because another fundamental convergence has come into being: the forward looking, enthusiastic support provided by the research advisors, Col (R) Dr. Christina Lafferty and Col (R) Dr. Steve Randolph, and by the ICAF Research Chair, Dr. Paul Davis. Their capability to look beyond standard procedure to nurture any possible development of thought has made this unusual initiative into an academic project. The quality of the academic support they provided, their open-mindedness, flexibility and readiness to enable opportunities speaks greatly of their academic level and sets high standards for the very work that strives for those fundamentals.

However, the major contribution to this work comes from the extensive education, training and experience by which the Israeli and the Italian Air Forces have mentored us. The great people and the leaders from whom we have learned, the schools, the operational and staff experience, and especially the intense squadron and wing commander assignments, have deeply

shaped our understanding of the issues we present. We are sincerely grateful for the investment our Air Forces have made in us.

The product of this exploration is a synergetic system composed of a conceptual approach -- both a knowledge base and a general interpretation tool for leadership issues -- and two strongly connected overarching models: *The CAL (Comprehending-Acting-Leading) Loop, and the broader C2PS (Confronting Complexity Proactively and Systematically) Model.* It is these models that suggest how to act in complexity and how to transform both leadership skills and organization's capabilities to be able to do it effectively. The research draws from the literature, but also greatly from direct experience and practical examples, focused listening, talking to people and it has been the object of countless discussions and daily debates across subjects, time and… thousands of commuter miles traversed by the authors. While many of the concepts highlighted need further research and discussion, it is nonetheless the intellectual understanding and the "gut-feeling" of two long time practitioners of leadership and followership coming from diverse environments and exposed to many different leadership levels and contexts that they really do work. The tough challenge now is to transmit to the reader both understanding and feeling.

Finally, the way this research was born mirrors significant aspects of the approach it advocates. Focusing on strategic issues and studying their root causes, seeking out other perspectives, capitalizing on diversity, teaming up whenever you can, staying flexible, seizing opportunities, are just some of the "must do's" to remain Relevant Leaders and effective Warriors…even when chance puts you in a car, in the highway traffic, with somebody else you don't know.

Introduction

The consideration that the world has changed in an astonishing ways has become obvious, almost banal. A vast amount is being said and written about globalization, the amazing evolution of the information technology and the related geopolitical, economic, social and cultural mutations that are taking place. New players have emerged and are continuously emerging -- international and internal, state and non-state -- whose relationship with our collective future is certain and very relevant, but still highly undefined. The environment is characterized by volatility, uncertainty, complexity and ambiguity[1], so dynamic as to baffle the senses. Yet, if this "VUCA" change is astonishing, it is its rate that appears often overwhelming. The pace of those mutations has been accelerating exponentially in the last two centuries, with profound implications on our capability to cope. Rapidity of change deserves special recognition as a major challenge, and a specific acronym: we call it *R*.

All aspects of human activity are influenced by these processes, and many threats arise and evolve in their context, often with subtle and yet extraordinary effectiveness. Opportunities emerge continuously as well, with potential implications of all kinds, including the most far reaching ones. Understanding these new Volatile, Uncertain, Complex, Ambiguous and Rapidly changing (what we now term VUCA*R*) challenges and being able to engage them effectively is the awesome task that our societies and our organizations face. Henry Kissinger recently stated that "traditional political thinking is inadequate to face Globalization." This is also true for any other kind of thinking. Political leaders, organization and corporation executives, military commanders, operators of all kinds and fields, and fundamentally all the people need to change the way they approach a fast and deeply changing world. Moreover, this is especially true for anybody who has to provide security where, besides the VUCA*R* challenges, there is an opposed

intelligent will focused on hurting us and capable of adapting to exploit weaknesses and mistakes. Leaders and warriors will quickly become irrelevant to their peoples if they use huge amounts of resources and don't deliver the result. The ability of organizations to understand and shape their environment; the agility to pro-act, making the adversary react; to perceive disturbances leading to potential threats or opportunities; and to transform to manage them effectively and efficiently is today essential for success, and subsequent ability to stay relevant. Or often just to survive.

But if many see the new effects of change in their everyday life, few have a systemic vision of what's happening and of how to deal with it optimized to confront threats and seize opportunities. The intent of this paper is to propose such a systemic vision, through a new frame of reference, theoretical and practical, capable of sound conceptual and operational answers to the demands the new environment imposes on organizations in general, and military ones in particular. It is based on a holistic and interdisciplinary approach, because the old specialist, slice-by-slice mindset is completely inadequate to embrace the new fast-evolving complexity and today, more than ever, is bound to strategic failure. It pursues Agility as a new fundamental requirement. And it is focused on the single most determining factor to make things happen: a leadership capable of dealing with uncertainty and change; of delivering results consistently; of transforming the assets and processes we have and creating the necessary new ones; and of transforming itself to anticipate and answer needs.

In order to build such a system, this work treads both a theoretical and a practical path. It first explores the evolutionary emotional and cognitive roots of leadership to define a general framework supporting understanding and decision making for actual situations, including new and unforeseen ones, and focused on maximizing the effectiveness in dealing with complexity. A

look at the broader frame of history and some related cultural drivers establishes a strong link between the biological and cultural aspects of the leadership relationship, reinforcing the approach. Eventually, the research examines some salient concepts from the theories of complexity and chaos that show fascinating relationships with human systems' behaviors and the characteristics of our environment. Some deriving leadership applications provide a practical tool to deal with VUCA and Rapid change phenomena in our world (VUCA***R***), amazingly resembling the dynamics of a generic complex system.

From this theoretical framework, a whole conceptual approach to relevant leadership emerges, as a knowledge base and an interpretation tool. Its basic principles and their consequences are then used to define relevant strategies and build applications. The first one is a practical leadership thinking-action cycle, the *CAL Loop*, conceived to convey assistance in taking decisions and actions in complexity and uncertainty. The CAL Loop enhances leaders' appreciation for the big picture, pushes them to be proactive and focuses action on the Mission and Vision of the organization. It is at the same time a leadership development tool aimed to enhance flexibility and disciplined decision making and action. The CAL Loop is then integrated in an overarching model, the *C2PS (Confronting Complexity Proactively and Systematically) Model*, showing the interactions between the strategic and the tactical level and the interface with the four elements of any organized action: Leadership itself first and foremost, then Culture, Process and Structure. The C2PS Model uses the CAL Loop to power the relationships in the organization, both through hierarchical levels and functional structure, to be able to shape it and make it agile and effective in the VUCA***R*** environment.

As in any exploration, we would like to provide a map to the reader, to help finding the way. Here is a mapped review of the reading ahead.

Part One is about the basics of leadership. In Chapter One, they are examined through the lens of our evolutionary past, with some recommendations on how to leverage the dynamics and overcome the limitations we inherited from it. In Chapter Two, we explore leadership approaches to complex environments through the frame of reference of the complexity theories, while in Chapter Three we connect our first model, *the CAL Loop*, to the concepts previously discussed, to provide an applicative tool for decision making and implementation.

Part Two is about leadership and organizations. It opens with Chapter Four's examination of how cultural drivers affect the effectiveness of the collective action, and how they directly connect to the dynamics and limitations of Chapter One and the complex behaviors of Chapter Two. The inferences from the previous chapters lead to shape our overarching model, *the C2PS model*, in such a way to integrate the CAL Loop decision making process into all levels of the organizations and, through the concepts discussed throughout the paper, influence the fundamental elements of the organization, to make it agile and effective in VUCA**R** environments. Observations on Relevant Leadership conclude the work, summing up the main conceptual and practical implication of our approach.

Actual examples reference and support the findings, hopefully sharing with the reader, beyond the intellectual comprehension of our proposal, our "gut-feeling" about it: it works. Its comprehension will assist understanding, leading and acting at all levels and in all contexts, but especially in the VUCA**R** environments of our age. Now, let's take this challenge on, and launch our exploration of leadership "on the other side of complexity."

Good luck, reader, you are now beginning your journey in a time before the Stone Age.

PART ONE

LEADERSHIP

Chapter One

On the Other Side of Complexity

"Never before has so much technology and information been available to

Mankind. Never before has Mankind been so utterly confused.

KPMG - It's time for clarity."

An advertisement of KPMG International, September 1998

The whole history of humankind has been a history of leadership. Yet most of the works on leadership focus on "what" to do and "how" to do it. Few ask the question "who?" Who are the actors on the scene? Where does their behavior come from?

Early hominids[2] were prevalently gathering/scavenging creatures. Chance and necessity, genetic mutations and environmental pressures pushed a transition to the hunting/gathering habits of later species. This in turn modified the hierarchical relationships of the basic social entity, the small group. From the ape-like tyrant role of the alpha male, related mainly to mating priorities and group protection, a transition to the cooperative approach necessary to optimize everyone's contribution to the hunt became obligatory for survival in numbers.[3]

That hunting leadership, refined through an age-long process of natural selection, has crossed thousands of millennia to end up on thousands of pages of academic research, autobiographic memoirs, "leader's checklists" and any combination thereof. But there seems to be little awareness of where leadership comes from, as if it were sanitized of its own roots, as if the transition time of a few thousand years, from the agricultural revolution through the information one, could have separated us from our biological heritage.

So, equipped for small group leadership and basically unaware of it, humankind's life is today based on huge organizations, crossed by an overwhelming information flow, in a very complex and fast changing world. It is a world of such complexity that good leader performance is very hard to obtain consistently and, at the same time, is critical because it impacts dramatically on the lives of great numbers of their fellows.

What kind of approach should we seek to face this inherent paradox? Recent studies have focused on leadership as a group relationship, shifting emphasis from the leader's behavior to the social interactions that occur whenever a group of humans pursues a common goal.[4] How the dynamics of that relationship originate is a most interesting question, to which a precise, encompassing answer is far from being conclusively determined. Nevertheless, the biological sciences show a deep connection between the evolutionary history of a species and its social behavior, and it is evident that learned cultural patterns have a big impact on the life of humankind, including its social relationships. This is the well-known dilemma about "nature or nurture," which often recurs in leadership studies. Regardless of any quantitative assessment on the effects of these two determining factors, we can draw a relevant frame of reference from this anthropological perspective, through a qualitative examination of the evidence available in this field.

Introducing this frame of reference can improve our understanding of the leadership relationship and issue some practical principles to implement it. That is particularly important in a world where a third critical interacting factor, the environment, is changing at an unprecedented pace, leading us toward the world of complexity we mentioned, simply unthinkable only a century ago. For humankind, living in this renewing world means being able to pursue common goals in an ever-changing dimension of complexity.

In this chapter, we will first define our epistemological framework so as to frame the methodology of our research. Then we will explore how the changing characteristics and the increasing complexity of our world impact on the leadership relationship, envisioning a conceptual approach to leadership through an anthropological frame of reference. The discussion will address our origins and certain basic human characteristics. Then, it will investigate how our world has changed toward complexity and provide some guidelines for leadership in a complex environment. From these guidelines, practical inferences will be drawn to reveal how they correspond in an amazing way with today's prevalent leadership theories. Eventually, we will highlight how our results flow into our first applicative tool, the Comprehending-Acting-Leading (CAL) Loop, defining its foundations.

Epistemological Framework

Much of this paper is based on inferences drawn from a qualitative, phenomenological point of view. Even though Chapter Two's discussion about the effect of cultural aspects on the effectiveness of the collective action is based on Robert D. Putnam's[5] extensive quantitative research, most of the concepts presented in the overall work are inferred from available scientific evidence and do not have the benefit of measured proof (or disproof).

A lively debate on the validity of the qualitative versus quantitative approach in human sciences has been ongoing. There have been outspoken advocates of both schools of thought, each with sound arguments on their side.[6] The point of view adopted in conducting this discussion is that positive scientific measurement is a most desirable, and in the end decisive, tool. Nevertheless, a logical, qualitative discussion of evidence and concepts can give meaningful insights into many problems, especially those related to human sciences. Much of the knowledge produced so far has been of this kind. This is obviously an important part of the

process of producing hypotheses for evaluation through quantitative methodology. As an example, the discipline of sociobiology, a recent branch of anthropology, relates the genetic heritage of man to his social behavior.[7] So far, geneticists have not been able to deliver the measurable proof of these relationships, but that does not mean there is no evidence of it, or that we have to wait for the complete interpretation of the gene map of man to reason on the available evidence.[8]

In a similar vein, our models visualize the dynamics of the concepts and relationships we discuss in this paper and draw mainly from the same qualitative evidence, as well as from direct experience. Consequently, we believe that a qualitative approach is fully justified for this exploratory work.

"Where Do We Come From?"

While we wait for the ultimate answer, which may take a while, we can use the available elemental explanation. Fossil and genetic evidence indicates that humankind evolved from "pre-hominid" apes living approximately seven millions of years ago. The first confirmed ancestor of ours was a biped creature with an ape's brain, a human gait and a social life. Through a very long evolutionary process, these creatures were gradually replaced around 2,000,000 years ago by a much more advanced species, the highly effective *Homo erectus* who slowly colonized most of the world, radiating from Africa.

The environmental pressures, genetic mutations and thousands of millennia selected for survival a very social, adaptive, skilled hunter with a unique characteristic: intelligence. This particular feature evolved considerably in *Homo sapiens*, who almost doubled *Homo erectus*' brain size. In fact, through more than two million years, the special cognitive skills and cooperative social bonds required by hunting were refined to produce, about 100,000 years ago,

the first modern human beings. The hunting skills became central among the capabilities that the mind of an early *Homo sapiens* had to implement. The very difficult business of regularly killing uncooperative animals led to the need for developing knowledge. This knowledge included understanding animal behaviors; developing techniques and collective tactics to achieve goals and gaining proficiency in employing them; and projecting the thinking in the future, to the next hunting season, for each type of prey. Technological capabilities were developed and refined, such as the impressive tool making skills, the ability to produce fire and the building of shelters. Social bonds enabled these skills, improving dramatically the probability of survival, prompting further development of intellectual and communication capabilities, and providing a common wealth of shared and orally transmitted knowledge. Hunting, social life, intelligence and their product, culture, constitute the bases of human development.

But…what about leadership?

The Social Animal

Well, we can say that group life accounted for the very survival of our ancestors. They were vulnerable, lacking the natural weapons of other animals and competitive size, speed and strength.[9] The hunting process was a dangerous business, as the parties would engage even huge or ferocious animals with stone weapons, relying mainly on collective hunting techniques and tactics. The outcome of the enterprise was dependent on the accurate coordination of group effort and on the active participation of all members. Leadership of a special, cooperative kind was fundamental to the success and thus to the survival of early man.[10] In addition to the vital task of procuring food, social life provided protection and support and satisfied essential needs. Once again, leadership enhanced and optimized these functions, filtering through the perpetual mechanism of natural selection in our gene pool.

To understand how strong the genetic "imprinting" of group relationships can be in social animals, we can look at a clear, everyday example, the dog. Its proverbial "faithfulness" to its master descends mainly from the leadership bond typical of the packs of its ancestor the wolf, partly transfused by blood. So strong is that drive that it remains extant to us today, notwithstanding that the object of that bond belongs today to another species.[11] It is, then, not unreasonable to assert that the patterns of social behaviors distilled in tens of thousands of generations of humans are similarly resident in our deepest being, and we must take them into careful account. We definitely are a "social animal." This is very relevant with regard to leadership.

To relate this "anthropological approach" to leadership with the current military world, we can refer to a seminal work of military sociology: the 1940 monumental research *The American Soldier*.[12] This work dwells extensively on what actually motivates an individual for combat, for risking his life with no chance of a commensurate gain in return. The findings show that motivation lies in small group dynamics, the mutual bonds that tie a group of humans together. These groups roughly resemble the size of those that roamed hunting grounds for countless millennia, whose cohesion was founded upon the utmost necessity for any living species: survival. Loyalty to the fellow members of the group, and among those to the recognized leader, is the major driving factor for willingness to fight.[13] [14] The exploitation of these group dynamic traits is particularly important to military organizations. The catalyst of the social skills required by the "naked ape"[15] to survive and, for example, for a fighter squadron to perform effectively is exactly what we now write papers about: leadership. Still, the same factors influence the effectiveness of the collective action in any organization: the inferences drawn from our phylogenetic history show that small group dynamics of a cooperative kind are the

foundation of our social relationship. This matches with the view of leadership as an "influence relationship among leaders and their collaborators…."[16] and puts into focus not only the leaders, but the role of their collaborators as well, and the existence of a mutual influence between them. Any leadership enhancement plan has hence to develop all the mentioned terms of the equation: leader, collaborators and their relationship. So far, most of the attention has been definitely concentrated on the first term.

We have seen how the dynamics of the leadership interaction were born in the small group and are still characterized in that sense in our mind. To give an example, the need for reference institutional figures, even if only symbolic ones, is evident in our complex societies, because the fragmentation of the leadership role often deprives us of the relevant everyday leadership we were used to in the small group. It's important to keep this "direct leadership" need in mind, especially when we deal with organizations far bigger than the primary group, since it requires adapting the basic patterns of the small group interaction to the various levels of organizational complexity. This implies a series of consequences for leadership at all levels which are explored from other directions: team building, cooperative leadership, justice and fairness in the organization, communication, and a personalized set of relationships, regardless of the size of the organization.

A further aspect of the small group dynamics concept is ethics. "Ethic," from the Greek word "ethos," i.e., custom, essentially addresses the social behavior of individuals. We have seen how social life was critical for the survival of humankind. It is clear then that complying with basic rules to insure group cohesion and effectiveness had a very high value. "Values" are actually the fundamental rules that any community's social behavior is based upon. But again our coping mechanisms were born in a small group environment and were largely activated by

the close relationship and social interaction that has characterized our evolution. We can very well observe how as the closeness of social interaction lessens, compliance with the social values lessens. The degradation of our megalopolis versus the cohesion of the typical small village is a standard paradigm in many people's experience. This issue is a fundamental one. In fact, values can be considered the very "glue" of society, because no effective (and in the worst case no organized) society, can be achieved without a willing compliance with fundamental rules. Furthermore, the complexity of our social relations is clearly going to increase in the future.

Focused efforts must be applied to understand and promote positive ethical climate. To do so effectively, it is necessary to refer also to deeper levels than those of our cultural or religious conventions, relevant as they are. An effective ethical system in a complex organization should strive to take into account the fundamental characteristic of our basic social behavioral heritage, exploiting the small group dynamics mechanisms, through their projection on the greater organization.

Former United States Marine Corps Commander, General Krulak, offers an interesting example of this kind of process, describing how the very intense first period training named the "crucible" was established for the new recruits. The problem was how to integrate the juvenile culture into the Corps. The consultants' answer was that the "kids" were characterized by belonging to groups of various kinds, with specific, strong sub-cultures. Within those groups they were looking for new boundaries for their behaviors and for the possibility to identify with a bigger, common challenge. They didn't mind following if they had the chance to lead. Additionally, they cared for a common "turf" and a friendly "overarching power." The "crucible" was designed to give them exactly those things: a very big challenge aimed at developing a tightly knit team, the chance to follow and to lead and certain boundaries of

acceptable behavior. Through the process, the values of the Corps become the values of the "turf", creating a strong, interiorized ethical base. It is working. What is especially interesting to note is how the "crucible" resembles the hard, intensely social life of our forebears we discussed earlier.[17]

Back to Leadership Basics…a Few Thousand Centuries

One main inference of the preceding discussion is that *people deeply need group interaction*. Leaders must support and nurture this inborn attitude because of the dramatic improvement in the effectiveness and satisfaction of the working group. It is not by chance that a major trend of organizations today is toward the "team building."[18] Another consequence is the *size* of the teams. "Organize small" (close to the size of the bands of hunters discussed earlier) is a definite trend in many organizations, even large ones.[19] Furthermore, on the basis of social needs, leaders can foster values that are universal in nature, bridging cultural, ideological and political barriers, strongly enhancing cohesion and effectiveness. Interpersonal bonds and cooperation develop, given certain conditions, even within groups of people of widely different cultures.

Another relevant inference is that *people need leadership*. Even in very loose, democratic environments, guidance of some kind, conflict management and a shared vision are a necessity. So, in any group situation confronting a coordinated task, a need for leadership will arise that, if unfulfilled, will hamper seriously effectiveness and the subsequent outcome. In the peculiar structure of military forces in particular, we must focus on ensuring strong leadership and, with growing levels of responsibility, we must aggressively ensure appropriate leadership is being exercised. People will appreciate that, for they dislike the uncertainty, confusion and injustice

that flourish under bad leadership. These once were threats to the very survival of groups, and still are today.

This brings us to another major point. We have seen how the transition from the predominately gathering and scavenging habits of early humans to the hunting habits of later species led to a shift in leadership style -- the hunt prompted a cooperative interaction among the member of the band. The leader had to "loosen up" considerably his authoritarian style and take into account the capabilities, inclinations and feelings of his fellows. Empowerment of the members of the hunting band just gave better results.

Many schools of management, from Human Relations to Total Quality Management, and more recent applicative development such as Lean Six Sigma[20], have extensively, and probably unknowingly, related to this ancestral inclination of humankind toward cooperation. From this point of view, the necessity of *a determinate leadership* and the necessity of *a cooperative, people oriented approach* share the very same reason for being: they belong to the behavioral patrimony of our species.

From the awareness of what our pre-history has been comes the thought of how important the group internal equilibrium of the simple social structure we are discussing[21] could have been for survival, and the consideration that a mechanism to maintain this balance must have been produced by natural selection. Some basic and still comprehensive social patterns and behaviors had to be featured in our biological heritage, much earlier than in our culture. The inborn perception of "fair behavior" with respect to culturally established values and rules that all humans share seems to be of that kind, as well as the need for clear social references needed to optimize group life. Leaders must take such issues into careful account. In this category belong

the perception of justice and fairness in organizations, upon which scholars are now focusing,[22] and the need for a straightforward approach to people, which may very well mean a *frank, direct, close-to-the-troops approach* that many successful leaders have practiced and still do.[23]

Strategic Leadership and the Narrow Mind

We have briefly discussed the social aspect of leadership through our anthropological frame of reference. To address the cognitive aspect of leadership, we now need to turn to human intellect[24]. To understand how human intelligence was shaped, we must go back to the world of early man.[25] Compared to today's standards, we can say that it was a simple world. We have seen how the hunter-gatherers dealt with a limited time horizon, characterized mainly by the influence of hunting seasons on their nomadic movements. They had simple but intense social interaction, since they lived primarily in small groups of 20-30 individuals, with rare but regular interaction with the extended tribe of up to 500 individuals. They were exposed to a limited number of contacts, mainly with familiar people. They had a simple economy, focused on two main activities, hunting and gathering, supported by the manufacture of essential tools and, for *Homo sapiens*, a few ornaments. They were physically very active. Gathering, tool making, and roaming were mingled with periods of intense, high adrenaline, rewarding physical and intellectual team hunting activities. They lived in constant contact with the natural environment.

Exposure to illnesses, accidents and the environment caused a very short average life and a rapid aging process, and occasionally much suffering. We can say that our forebears, those who survived the many challenges, led a hard but simple life, in the very environment that molded them. They were exposed to a limited number of interactions and processed limited information, mainly available in familiar patterns and in a limited timeframe. When they couldn't explain something, they would turn to deities; which seems very much the case today.

Why should we care about these "ancestral roots" so distant in time and to our lifestyle? First of all, it is because they are not distant at all. In evolutionary terms, they are very, very close. Humankind kept the original hunting gathering lifestyle for well over 99% of its evolutionary history. The time involved in evolution is such that the gene pool selected through those millions of years of "pre-history" has necessarily been carried on until today, since the "explosion" of human culture has been extremely brief in relation to the evolutionary times. Surviving hunting peoples, left by isolation in Paleolithic stages of cultural development, have an intellectual potential and gene pool identical to ours.[26]

It is very difficult to draw a line between nature and culture-induced behaviors for man, due to our extraordinary cultural sophistication. But we can very reasonably say that there is a strong genetic base both for man's social behavior and for his intellectual capabilities. On this common base, cultures differentiate, depending on the environment. We will unfold this discussion more extensively in Chapter Four.

What Has Changed Since?

Nothing and everything. Nothing has changed because we are biologically the same as our hunting predecessors. The brain size and structure and the basic cognitive skills are the same. A few thousand years, from the Neolithic transition to agriculture to the information revolution, couldn't undo what had been established in thousands of millennia.[27] We use simple patterns to achieve knowledge. We need to break a complex problem in different simple parts that we handle in our very limited short-term memory to understand them through reasoning (analysis).[28] Then, we relate the elements to gather their relationships and understand them as a whole (synthesis), possibly figuring out the best way to intervene in the process to influence the outcome.[29] We can cope, slowly, with a limited number of variables, preferably with one at a

time. It's hard for us to envision indirect consequences, especially beyond the second order. There is an overwhelming trend to appreciate the world from our personal point of view, just like we happen to physically view it. Our eyes scan the environment from the very center of it. Our judgment is heavily influenced and sometimes totally overridden by our emotions,[30] making effective understanding even more difficult, sometimes impossible. Evolution has not tailored our brain to highly complex systems. It has given us basically a sometimes sharp, narrowly focused instrument – a limited "wet computer" extremely dependent on hormonal levels.

Nothing has changed but everything has changed. Everything has changed because we live in an environment that has increased in complexity many times in a short period of time. The industrial revolution and the related technology explosion have brought a change in human lifestyle in a few generations larger than the one that occurred in the hundred previous generations. The post-industrial, information age, seems to be fostering a much more rapidly changing world. And this change keeps humans interacting with an environment we are not engineered for: one of ever-increasing complexity.[31]

On the other hand, humans are building this complexity -- we should know how to cope with it. So far, we haven't coped very well. The answer for the industrial culture to the huge complexity leap produced was to simplify through specialization and compartmentalizing knowledge. Every "knowledge builder" was, like a proud kitten, climbing the tree of discovery in a single field, with little idea of the forest around. Thus, the progress in technology has been paid with a worrisome environmental impact. A "scientific management" of work meant the alienation that Charlie Chaplin parodied so well in his movie "Modern Times." Organizational "rationalizations" resulted in huge centralized structures whose members felt little responsibility and no sense of belonging. And value systems, the very glue of society, seem to have become

increasingly unstable, as phenomena such drugs, crime, violence, corruption and the many other social problems too often remind us.

Relevant advances were achieved by the simple focusing power that specialization implies. But too often the proud kitten didn't see anything but her exhilarating climb. She didn't see the forest, nor the unintended consequences, nor how to climb down the dangerous branches of the tree. There is no blame to be placed. But surely the remaining, critical part of our job is learning how to deal with this very uneasy dimension: complexity.

Modern culture has produced complexity. The sheer volume of information available today is mind numbing. The number of interactions that any actor, be it a nation-state, a commercial enterprise, a commander, a parent or a single individual deals with today is far greater than only a few decades ago, and vastly incommensurate with previous centuries. The global economy, the telecommunications network, the media, bureaucracies, fast and affordable transportation, the political dialectic, technology in all fields and especially information technology, as well as the sheer number of people we interact with, make life much more complex today than ever before.

To make things harder, any culture, the understanding of the world that any social body shares among its members, grows upon the basis of the biological heritage we discussed. In fact, culture reflects basic human characteristics. Each culture tends to be self-centered and heavily influenced by collective emotions. Prejudice is extremely common, and the average level of analysis (the so-called "layman" or "man of the street" understanding,) typically scores fairly low. Most of the times, the focus is on particular issues, more than on the "big picture." Our culture, notwithstanding its impressive technological and scientific achievements, seems to match its evolutionary matrix toward a default narrow-mindedness. Unfortunately, strategic thinking, and strategic leadership are not produced in narrow minds. So, what should we do?

Broadening Trends

We must look for a "broader mind."

To lead in the VUCA***R*** environment, the cognitive capabilities of leaders at all levels are critical, together with their ability to network their minds. Obviously, the need to broaden thinking abilities, especially for the leadership, is certainly not a new one. Many institutions and publications concerned with strategic leadership, especially educational ones, address this issue. Still, unresolved gaps and contradictions appear in many of the strategies to promote strategic thinking. We will discuss some of these problems, to identify areas where leadership development can be improved.

"Know Thyself"

The very first gap is the lack of explicit awareness about "the birth of the narrow mind" and of its limitations. Not clearly knowing the limits of the "…most powerful factor in the war-fighting equation: the human mind"[32] can lead to large miscalculations, at the strategic level. Leadership is basically "…influence relationship with people"[33]: knowing yourself and your fellow humans is a skill fundamental to it. How can it be done? Certainly not by transforming leadership education into a social science academia. However, between that and almost complete neglect, reasonable options do exist. It is possible to synthesize the contribution that human sciences, like psychology, sociology, anthropology and others, bring to leadership education. These "fundamentals of leadership" could serve as an enabling frame of reference for the traditional curriculum, before the posited lists of precepts or the case studies usually found. New curricula can be designed to contribute effectively to this understanding. Moreover, understanding the role of our biological and cultural heritage with regard to small group dynamics, to ethics, to thinking abilities, and how all this takes place in our huge organizations,

is critical. Educating leaders to be highly introspective, to be able to detect the influence of their own emotions on their thinking and to manage them, though difficult, is possible and is precious to the clarity of strategic thinking. It is also a powerful way to get to know our people, since we share the general architecture of our inner world. Initiatives in this sense already exist, such as the use of self-awareness personality testing in leadership and human resources development programs.[34]

Historia Magistra Vitae (History is life's teacher)

Another problem frequently found in strategic leader education is an insufficient emphasis on ensuring an understanding of the major underpinnings of history. The dialectic and contradictory nature of reality, the adversarial nature of processes and the relativity of value systems are some of the breakthroughs of the western philosophical thought that strategic leaders often ignore at their peril. Again, strategic leaders don't need to be philosophy majors; however, we must ensure we don't develop leaders with a "black or white," narrowly moralistic vision of the world, or with the inability to comprehend beyond personal biases the role actors play in complex processes.

Leadership, Ethics and the Understanding of the World

We briefly discussed the role of ethics in group behavior. But ethical awareness is critical also for sharp cognitive capabilities. Operating in complex environments -- where events and people usually interact in a less than clear-cut manner, where values appear to be relative and misbehaviors widely publicized -- increases the risk for ethical uncertainty. Stepping up to a more comprehensive, less fragile ethic than the "good or bad" one, is necessary to reduce our biases and enhance our understanding of the world and to induce ethical and not cynical answers to the ambiguity and contradictions of our era. The conceptual foundation discussed previously

with regard to understanding of man and history is necessary for ethics education, because of the insights it offers also on this issue. If we fail to pursue a deeper level of ethical awareness, structured to accept truly candid self-assessments and sharp critical thinking, we end up looking only at the part of the picture that fits our perspective. This is destructive for any strategic decision making process. A deliberate examination of this ethical issue seems to be overdue in the mainstream of leadership development.

The Nuts and Bolts of Strategic Thinking

When we get to the "mechanics" of strategic thinking, there is a great deal to be said. Little effort is spent in promoting in "strategic leaders to-be" an awareness of "how" they think, instead of simply the "what." Group discussion of issues is certainly a good way to broaden perspectives. But how best to do it and what the factors and the principles that influence the thinking process are, is usually not addressed. While a detailed study would be necessary to establish what to teach for this purpose, we will discuss a few major issues, to illustrate the concept.

Deductive Reasoning

Learning to think from big to small (deductive reasoning), versus the other way around (inductive reasoning), common at the tactical level, is a must for strategic leadership. The strategic leader must be a big picture seeker, able to use broad frames of reference to interpret events and devise plans. John Warden, considered by many to be one of today's foremost strategic thinkers, highlights effectively the need for this approach in his introduction to his "Five Rings" model.[35] The way people think depends both on personality[36] and culture[37]. Understanding individual tendencies and focusing on compensating for personal weaknesses either in the inductive or deductive modes of reasoning are very important for effective thought.

Military culture seems to need more work on the deductive, big picture mode; emphasis is needed in leadership development curricula to this aspect.

Frames of Reference

Once the ability to look for the big picture is acquired, strategic leaders need to seek out as many different ones as possible. They need to become experts and habitual users of different frames of reference, capable of relating them together and to their own, so that they can continuously evolve and improve. Developmental theory sees leadership development "…as adaptive changes to the soldier's leadership frames of reference as he progresses through successively higher organizational levels."[38] To progress, a leader has to be used to understanding other points of view, other frames of references. Most of the time, frames of references are "transparent" to the untrained user. Strategic thinkers, however, need to be conscious managers of the ones they operate with. We cannot start teaching these abilities to senior leaders. Education promoting this unnatural skill should be formally integrated since the early stages of the continuum of leadership education, with a proper progression.

Convergent Thinking

Learning to "Think Big" and habitually referring to different frames of reference greatly increases the power of analysis, but it doesn't necessarily affect synthesis. Leaders must also be good at "convergent thinking,"[39] when all the available elements are correlated and synthesis is brought to bear on goals. While it is very important to be able to maximize the analysis, it is critical to know when to switch to the synthesis mode. Divergent thinking allows understanding of our environment, its trends and vectors, and devising strategies for intervention. But if we intervene too late, it is no good and it can actually be much worse than a less thought out decision, but a timely one. So, the ability to sense when it is time to switch to convergent

thinking, and decide, is a critical leadership skill. While this is a largely intuitive skill, it is so important that should be addressed in leadership training and mentored in young leaders. A current academic methodology for leadership education, open-ended group discussions, though a potentially excellent approach to different perspectives, are not enough to develop synthetic thinking; some shared practice for synthesis is required. Synthesis does not mean "school solution" or "the solution" to the discussion or a watered down, "least common denominator" solution. It does mean attempting to build, dialectically, a big picture, that can legitimately be agreed or disagreed upon, but that is likely to produce results. Not proceeding beyond the analysis level risks leaving many in the "thinking small" mode (lots of details, no big picture).

Thinking "Know How"

In some fields, principles, procedures, and techniques are used to assist the thinking process in complex, ambiguous, volatile and uncertain environments. Such an environment often exists, for example, around the scattered and burning remains of an aircraft accident. From them, the investigators must put together a detailed reconstruction of a complex sequence of events, maybe started years before in a factory, or in the hearts and minds of people now dead. Principles such as "never jump to conclusions,"[40] search and collect all facts and data before even thinking of inferences, look out for one's own and for the witness' biases, and others, are the conceptual foundations of a professional investigator. In the corporate world, creative thinking and problem solving techniques have also been devised. Leadership development is much more than learning techniques. Nevertheless, when thought is employed on matters of strategic relevance, there is no excuse for not exploiting the existing "thinking know how." Leadership development curricula should then make sure leaders are able to use such know how.

Conflict Management

Conflict management relates to everything we have discussed so far. We saw how we still share the gene pool of our hunter-gatherer ancestors. The basic patterns of our social interactions originate in the small group dynamics of the hunting band. There, close personal ties generally defused conflict, by mutual reliance for survival, and by constant verbal and non-verbal communication. But we now work in complex organizations, interacting constantly with people we barely know and often don't see, and whom therefore we don't really care much about. Our culture is based on individualism, on competitiveness, on the mononuclear family. In this environment, effective communication is much harder, and its likelihood decreases enormously. We then search for our "lost band," reverting to an artificial, contradictory creation of a network of "they-us" dichotomies: "fighters vs. heavies," "rated vs. non-rated," "field vs. headquarter," "Air Force vs. other Services," and so on. This occurs in sports, and at the political, institutional, national and international levels. Conflicts, based on the lack of the group trust upon which our survival once depended, flourish. To operate effectively in this environment, leaders must thoroughly understand the dynamics of conflict, and how to reduce it or exploit it for the good of their organizations. Communication is the primary tool for conflict management, and leadership development courses must assure that its potential and its traps are well understood. Other techniques for managing conflict can and should be acquired, together with the aforementioned broad background of a human understanding. In particular, leadership expertise should include a thorough comprehension of the "negative feed-back ring," or the "conflict spiral." This very common phenomenon often takes place when the perception of other actors' behavior is even marginally negative. It occurs when trust declines, often for a lack of understanding of the other's perspective, due to a lack of communication, or to cultural biases.

The negative feedback to the perceived misbehavior prompts further negative response and conflict soon arises. This dynamic happens from family quarrels to international conflict. Too often conflicts disproportionate to the actual interests at odds arise because of this process, making it the nemesis of a cost-effective leadership. Self-awareness, and the big picture, multiple frames of reference thinking advocated should help to prevent it. Strategic leadership development can, and should, enhance the specific understanding of this phenomenon, and the capability to influence it.

Information and Technology

Looking back at our exploration, we see that every hunter-gatherer could bring his contribution to the hunt through direct communication, initiative and cooperative leadership. That was possible in a simple environment. Today, change "hunter-gatherer" with "soldier" or businessperson, and "hunt" with "fight" or business: complexity is the hurdle. But technology is providing some promising tools. The information technologies (IT) allow today extraordinary capabilities for direct, decentralized communication, for networking of people, for access to information and for processing complexity, showing simplicity through user-friendly interfaces. Knowledge management systems have the potential of broadening our horizons, still enhancing our capability to decide, giving to all interested actors the relevant synthesis they need to act at the right moment. Information technologies may contribute to our wisdom, as they continue to assume a fundamental role in all fields of human endeavor. Leaders at all levels confront them as an everyday tool and as a powerful influencer on their environment. The extent, depth and rapidity of the transformation they bring are such that it is hard to grasp their broad, longer-term consequences[41]. Focus on this issue is necessary, to understand the challenges and, especially, the opportunities arising from the information revolution. The extraordinary capability of

information technologies to network minds has a great potential for leadership effectiveness. Intelligent networks in general and the Network Centric Capabilities (NCC) [42] in particular for the military field, if properly used, aim to the big picture, and are intrinsically based on a holistic approach, to produce effects; they are an empowering agent, through decentralization of decision making and posting and selective acquisition of information. Networked leaders at all levels become information processor nodes, oriented by the strategic leadership, capable of diffusing knowledge and, again, to process complexity to communicate simplicity.

In a sense, through intelligent networked capabilities, we can get back to our biological dimension in a "virtual band" of hunter-gatherers, "on the other side of complexity".

Wisdom Systems

The basic, plain truth is that we enter the century of interplanetary exploration with an original Paleolithic mind. So far, our culture has largely ignored the limitations of our mind, focusing instead on its noticeable achievements, while complexity is pressing hard our capability to cope. We need to pursue a "broader mind" as a fundamental tool to confront complexity, and we offer some guidelines to do so. We need to mentor strategic leaders and network knowledge. To do so, we should seek a broader frame of reference, including a better understanding of man and a deliberate nurturing of the thinking process, through a multidisciplinary focus, using the human sciences and the problem solving know-how. We also need a "Network Philosophy," a clear conceptual approach that uses information technology as a leadership tool, a "knowledge enabler" in all fields.

We need both to achieve an effective wisdom system for today's complex environment. Otherwise we will probably remain good at "doing things right," in a linear, increasingly sexier high-tech fashion, but we'll find increasingly difficult "doing the right things"[43] in a complex

and ambiguous environment. It is the latter that must become the realm of true wisdom of true leaders. Inferences stem from the brief exploration we conducted so far "on the other side of complexity": they lead us toward further exploration.

Inferences

Many authors have written about the future, change, and complexity. Many others have studied the cognitive processes of the human mind.[44] Others yet have dealt with the interaction of these fields with leadership.[45] But we seem to be as distant as ever from any unifying theory on the matter. The first inference emerging from our discussion is the need to strive for a truly interdisciplinary approach to the leadership problem as a basic strategy to face the inherent complexity of human systems. This research is built exactly in such a way, integrating different disciplines and frames of reference. We think that many disciplines, like Sociology, psychology, history, anthropology, management and leadership studies, studies of non-linear or complex systems and any other related (and unrelated) one, would greatly benefit from a strong, focused research for a network of connections, for a dialectic overlay of different frames of reference to investigate the "one reality" we live in. The accelerating progress of some "hard sciences," like genetics and paleoanthropology, could in the future well support and integrate the other disciplines' efforts.[46] A fairly recent discipline, called "evolutionary psychology,"[47] investigates the evolution of the human mind, to retrace the biological basis of our behaviors. All this could result in the stronger conceptual basis we feel the need for in the "applied" leadership relationship.

Major trends of current leadership studies also validate this discussion. A vast literature, from the "Human Relations" school to "Situational Leadership,"[48] from TQM[49] to the concept of Servant Leadership[50], from the Strategy Focused Organization[51] to the Lean Six Sigma approach

and the studies about change in the organization[52], converge toward the need for a cooperative relationship, for the involvement and empowerment of the people, and for team building. Research about our cognitive abilities shows our mind's difficulties in coping with complexity.[53] Our incredible cultural adaptability may allow us to live in a depersonalized, uncooperative, overly complex environment. However, this is not what we are made for. We suffer and underperform in it. It is important that leaders and collaborators understand this in order to establish mechanisms apt to overcome the steep, ambiguous obstacle complexity presents. These mechanisms must be based culturally on the "big picture approach" for every level of complexity faced, and operationally on the understanding of small group dynamics and their application to big, complex structures. The challenge is interconnecting teams in the overarching organization, so to project on it the *esprit* and the cohesion of the small group. The expression "A Team of Teams" describes very well this concept. What this anthropological frame of reference does for us is to state that the drive toward a people-centered leadership is not just a trendy fashion. It ties to our deepest being and it is the only way to go if we are to achieve the levels of effectiveness necessary for our future.

But the most immediate operational consequence of the awareness discussed is the fundamental role of the leader as an information processor. This role sees leaders understanding complexity and its traps, relating to their people a clear set of values based on their ancestral needs and their specific culture, educating them to a critical, broad-minded approach tailored for each level of complexity faced. Leaders have to simplify reality without losing its richness and involve their people in the process, leveraging the extraordinary resources the information revolution gives to them. This ability to "see beyond" may well be identified with what we call "vision." The "vision" we will need for leadership in our complex world has to be able to

establish "simplicity on the other side of complexity."[54] To be able to build ours, in the next Chapter we will briefly explore the new science of complexity and chaos, to look for any meaningful contribution to our leadership quest, and for any hidden simplicity there.
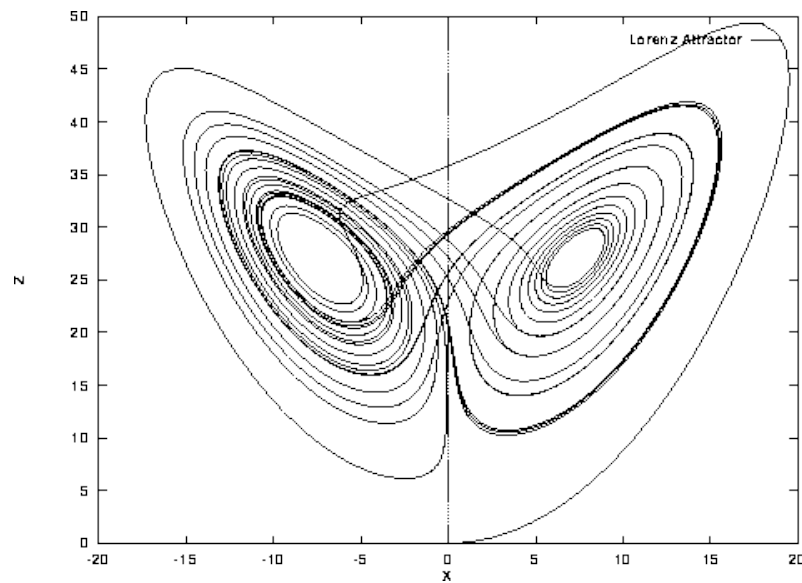
Chapter Two

Complex Adaptive Systems

"Our logic is tired, and presumptuous. And it is so because it is old."

Ciccio Battaggia, after a few glasses of wine.

While we were discussing our quest for a leadership "on the other side of complexity," many others had long been working on a scientific approach to complexity "per se", from completely different avenues. Edward Lorenz, an MIT mathematician, discovered in the '60s the "sensitive dependence on initial conditions" of complex systems, omitting a seemingly insignificant 0.000127 from a weather computer simulation, and obtaining a completely different outcome from the previous iterations. The ensuing studies opened up a new world for exploration[55]. The "Butterfly Effect" deriving from that dependence, where a disturbance created by the flapping of a little wing in Brazil can trigger a tornado in Texas[56], has become an intellectual icon. It shows powerfully how in complex systems the smallest changes can establish a network of expanding consequences in larger and larger contexts, until unexpected outcomes happen, even in far away, time-remote and much broader environments. While further studying the non-linear processes pertaining meteorology, Lorenz sensed an order beyond the unpredictability of chaos. His plotting through computer-graphics of some related mathematical functions led to the amazing visualization of that order: Lorenz's "strange attractor," today universally famous.

Figure 1: Lorenz's "strange attractor,"

Non-linear equations are most often impossible to solve. Still, their visualization shows how a complex, non-linear dynamic system exhibits some kind of self-organizing pattern, when the system is considered as a whole.[57] Lorenz started a field of studies opening fascinating perspectives, visualizations (through fractals) and also applications. But we are not into a history of the science of complexity and chaos. Others do very well at it, at various levels of depth, as we can see by even a quick exploration through a search engine, and our references.[58]

We are, however, into seeing what this new science can contribute to our quest for the best possible leadership. We must try to understand through as many significant frames of reference as possible, to acquire all useful tools to lead and operate "on the other side" of complexity. The science of complexity and chaos can enable us to find some good ones. Let us see what observations and applications we are able to focus on our goal.

Observations about Complex Adaptive Systems

"Over communicate."   *"Communication is never enough."*

Yakov   *Nando*

The first thing we need to know is what a complex system is and how it relates to our field of interest. To anticipate a simple answer to the second question, we might say that complexity relates to leadership because we are dealing with leadership in complexity. It is also true, as we will soon discuss, that human societies and their organizations fall into the "Complex Adaptive System" category. We believe that some general principles of recent complex system studies yield interesting concepts for leadership applications. To answer the first question, let's start with a couple of definitions, and look into how complex systems generally behave and evolve, how communication shapes those behaviors and what kind of approach we should use towards them.

Definitions

Even tough there is no single formal definition, studies of nonlinear dynamical system converge in outlining the concept of complex adaptive systems (CAS) as "open, nonlinear evolutionary systems, such as a rain forest, that are constantly processing and incorporating new information"[59]. Gandolfi[60] defines CAS as "an open system, formed by numerous elements interacting in a nonlinear manner, which constitute a single, dynamic and organized entity, able to evolve and adapt to the environment". We will refer to them as complex systems, implying the adaptive connotation.

Behaviors

So, a complex system is open: it exchanges material, energy or information with its environment, through a process of input, elaboration and output. It is nonlinear, inasmuch

varying in a regular way the input; the output can behave in an irregular, non-proportional way: i.e. there is no direct relation between what you input and the results achieved. It is capable of evolving and adapting through the exchange interactions, and these are not sequential, linearly connected, but rather linked in a simultaneous, network-like process. Through these connections, a generalized feedback mechanism operates: the output of one node inputs in several other ones, which may very well eventually feedback into the former, through the network density. Feedback cycles are so established and diffused. When such cycles are self-inhibiting, dampening their own effects, they tend to stabilize the system. Systems in nature maintain stability through this mechanism. When feedbacks are positive, stimulating further output and thus reinforcing effects, they can push divergence of the system from the equilibrium conditions, spinning it out of control or blocking it completely.

Because of all of the above, a complex system is hard to predict in the short term and practically impossible to predict in the long term. The direct cause-effect and time relationship between input and output is lost in the extraordinarily complex and subtle network of dynamic exchanges influencing each other; the system can be very sensible to small differences and capable of strong, rapid divergence from previous equilibrium. Observation of complex systems then yields another fundamental characteristic: their trend toward a hierarchical and self-organizing structure. From life itself, organized from the molecule to the ecosystem through many hierarchical levels, to human societies and to the economy, the growth and evolution of the interactions makes the system more complex. When these interactions cross a critical threshold, structures form, organizing many of the elements. A collective, coordinated behavior emerges, with new properties typical of a new, higher level of organization. This new behavior, integrating the previous different ones, creates a new rule set.

Even very simple actions, iterated in parallel by large numbers of elements, either computer-simulated or actual, can produce an amazing higher order; like the elementary behavioral pattern that ants follow unknowingly to produce huge and outstandingly structured anthills. In this and many other cases, understanding elements is not enough to understand the system. Complex systems, actual or simulated, show other interesting characteristics. Depending on internal and external influencing factors, they exhibit different behaviors: orderly, chaotic and "in-between," otherwise defined as "complex." When the first one prevails, the system is very static, and only limited, isolated areas display a dynamic behavior. When chaos prevails, the system shows great instability, random fluctuations and inability to create organized behaviors and evolution. In the "in-between" status, though, the system shows the maximum capacity to evolve, to adapt and improve, displaying the trend to self-organize and attain a high degree of flexibility. These behaviors are influenced by those aforementioned internal and external factors, defined hereafter as "control parameters." Even without actually understanding the control process, modulating the control parameters steers the system toward one of the behaviors. Control parameters can, if you find the right ones, strongly influence complex systems' behavior. Interesting enough, in one of the studies -- Christopher Langton's cellular automata simulations -- the control parameter influencing the shift from a status to the other was the modality of information exchange: λ. A low λ means a slow and difficult information flow, while a high one means an easier and faster one. Increasing communication changes the nature of the system: from "frozen" with a low information flow, to chaotic with a very high flow, to complex, adaptive and evolving "in between."

Evolution and Stability

As mentioned before, the evolution of complex systems happens mostly "in between" the static, frozen status and the chaotic one. Most scholars of complexity from different disciplines converge on the way this evolution takes place.[61] After a long period of relative stability, where fluctuation were stabilized by negative feed-backs and balance was achieved, the spontaneous changes in the system and/or major external disturbances lead to a critical point, where instability is triggered. Fluctuations are amplified by positive feedback dynamics; vast scale chaotic behavior and unpredictability ensue. The networking of a great number of positive feedback cycles, feeding one another with a strong reinforcement of divergent behaviors, enables the quantum leap. This kind of "chain reaction" is called hyper-cycle. Eventually one of the fluctuations projects the system into a new stable state, at a new level of complexity: we have what is defined as a "Catastrophic Bifurcation" (even if it often has positive results), or "Strategic Inflection Point",[62] or "Tipping Point".[63]

This pattern can be observed in many different environments, including social settings, like in the rise of Nazism or the Russian Revolution, in organizational dynamics, in the evolution of species, and even in the organization of ideas and thoughts conducting a research. Laszlo states clearly that the course of evolution, notwithstanding how chaotic and disorderly it may appear, is guided by general laws that can be scientifically studied and are valid in the same way as for physical, biological, ecological, human and social systems[64]. James Gleick's[65] best-seller, *Chaos: Making a New Science*, postulates that most of the processes of our world can be described through the chaos and complexity theory: for example, weather patterns, market behaviors and the physiology of the brain. This pattern of change seems to be quite common. On the other hand, observation tells us that while nature is sometimes chaotic, it is not always so.

Human societies are not always in a state of anarchy and chaos. "Usually, chaos doesn't last long. No society can exist without some kind of order".[66] Furthermore, it appears that there might be a "weak chaos," less sensible to the initial conditions and with a higher probability of forecasting medium-long term developments.[67]

The very stability that in any case prevails in this scheme of things is an interesting phenomenon, widely observed and largely unexplained yet. It appears that an increase in the complexity of a system is generally accompanied by an increasing sensitivity toward disturbances. Yet, more complex systems are often more robust and resilient. Communication, in its widest sense, is believed to be a major stabilizing factor. The Nobel Prize winner physicist Prigogine[68] attributes the dynamic equilibrium we observe most often to "…a competition between the stabilization given by communication and the instability caused by fluctuations." Even if communication is here intended as an exchange of any medium, chemical signals, substances, information, ideas, a more specific and most fascinating question turns inevitably to human systems: what is the role of information and ideas exchange for humankind? Is it stabilizing or destabilizing?

Uri Merry[69] explains the stability-complexity paradox, highlighting how to become more complex, a society must invest substantially in its internal ties and communication. If it does so successfully, the very same network is the cause of its resilience and consequent stability. If our societies will not understand the growing communication needs, they will face times of growing turbulence. "These chaotic transitions, hopefully, will enable the system to self-organize and transform itself into a higher order of greater responsibility, cooperation, mutual aid, and support between its societies".[70]

Eventually, we like to use Yaneer Bar-Yam's words to highlight a conceptual approach of complexity theories to communication: "Indeed, one of the main difficulties in answering questions or solving problems – any kind of problem – is that we think the problem is in the parts, when it is really in the relationships between them".[71]

More on Communication

Another perspective on the relation between communication and human systems shows that information exchange modes have marked some major "catastrophic bifurcations." When a group of upright, gathering-scavenging creatures found themselves facing the challenges of the savannah, they started to rely heavily on group behaviors for survival. The more the cooperation needs grew, the more transfer of information became valuable, at times critical. By the time they became the effective band of hunters we discussed earlier; spoken word had become the major enabler of collective action, allowing symbolic communication, collective memory through oral tradition and therefore culture: the band had leaped from being an ape-like shrieking and gesturing group into becoming a "learning organization." New modalities and quantities of information exchange, language, supported and were supported by our very first and foremost first catastrophic bifurcation: intelligence; and the first "information revolution."

However, the amount of information exchange needed by our hunting ancestors was not comparable to the one required by the new social and economic structure emerging from the agricultural revolution. Accumulation of excess food, emergence of property, division of labor, rise of hierarchical structures and religious "professionals," all made the world more complex. The need to record, to bequeath and communicate to answer the needs related to the new human behaviors pushed toward the written word. This time, many examples of this powerful development are recorded in history, together with their connection to the rise of the great human

civilizations. Again, a quantum leap in information exchange has accompanied our second great catastrophic bifurcation.

The information flow across languages and manuscripts sufficed the agricultural societies for thousands of years. However, communication diffusion was slow and unreliable, since it was based upon few, extremely expensive hand copied parchments or analogous products, besides the age-old word-of-mouth. The renaissance at end of the Middle Age, the new manufacturing, banking and trading patterns, the rise of national states and their bureaucracies needed more to happen: again, the printing press impressed a quantum leap in information circulation. Books became cheaper and numerous journals were born. A much more efficient information flow was again cause and effect of a major change in human society, preparing the base for the diffusion of the emerging sciences and, eventually, the industrial revolution.

We could argue about the impact of telegraph, radio and television, telephone and fax on human systems, and we would find a deep influence on human collective behavior. Mass media have certainly shaped our world, circulating ideas and information much faster than in previous times and leading our culture to its post-industrial paradigm. But the actual, gigantic next quantum leap in the one still in mid-air: the so-called and much discussed great Information Revolution. Where it will take us is not at all clear. "There is a pattern and it has direction; it is not necessarily 'progressive'', that is, we need not believe that we are gradually approaching some 'desirable' goal", as Isaiah Berlin says about history in general.[72]

It is clear, though, that our world has changed and is changing many orders of magnitude faster today than in any previous information revolution, through unimaginable amount of information exchanged, tapped, found, crosschecked, organized and elaborated among a huge and ever-increasing number of actors of many kinds. Communication, information exchange has

configured this super-network as a true complex system, after a critical mass of technology and culture has reached a catastrophic bifurcation. Some more may lie ahead. We do hope that this quantum leap will take us toward the "wisdom system" we closed Chapter One with, and from there toward the "greater responsibility, cooperation, mutual aid, and support" that Uri Merry advocates in our previous quote. Some of the terminology lends hope: we used terms like "Knowledge Systems" and "Wisdom Systems" as a necessary trend in relation to leadership in the Information Age.

Meanwhile we can say that communicating, in its wider sense, is a powerful shaping force. It seems to operate through the typical evolutionary mechanism of complex systems, maintaining some kind of homeostasis between stillness and chaos, until stability is broken and a leap to a higher level of communication is achieved. We do not understand much of how and why all this happens. We do understand that we want to use it, making it one of the control parameters, in the attempt to influence stability and agility of our systems. Let's see an example of how the shaping power of communication can be brought to bear in an organization, briefly discussing how the IAF feedback system for leaders' improvement establishes relevant communication both for form, bottom-up, and content, leadership effectiveness. This unusual approach, child of the peculiar, pragmatic vision of the IAF, adds value to the effectiveness of collective action, establishing a "control parameter" on leadership itself.

A Brief Digression on Leadership and Communication Flow

"We pay them, we teach them and then we ignore their opinion."

General James Cartwright, StratCom Commander

The idea of listening to the young officers is not a new one; nevertheless, as Gen. Cartwright frankly said, there is a subtle tendency in leaders not to really seek their opinion,

because of overloading, cultural issues, ego dynamics or other reasons. In order to make the organization more agile, leaders must establish a two-way communication. New challenges, threats and opportunities should be highlighted swiftly throughout the chain of command, at the decision making table, and in many cases understanding and implementing the decisions needs its communication path as well. In the following section, we would like to describe a structured feedback mechanism from the lower levels to the strategic ones, which we believe will offer a higher rate of agility and better and quicker transformation of an organization, through better leadership and a culture that supports bottom-up communication. This feedback mechanism, well rooted in the Israeli Air Force, corresponds to our understanding of a recommended tool to achieve a better organization. Let's open a window and conceptually discuss this mechanism.

The Feedback Mechanism in the IAF

What will be the impact on leader's leadership style if he knew in advance that his directed subordinates would write anonymous feedback about his leadership skills, and specifically whether he leads by example, whether he is loyal, he is a strategic thinker, how dedicated he is, and so on? The subordinates in that organization know for sure that the information they provide remains anonymous, that their feedback will be collected and analyzed in the aggregate and then will be provided to the leader in order to help him improve. We believe that the leader might be much more focused on the questions posed in the feedback survey, and, therefore, consciously and unconsciously the leader will transform his style toward the desirable behaviors.

Actually, this tool, *the feedback mechanism*, is deeply rooted in the culture and the systems of the IAF, and although has a few weaknesses, it does enhance leadership style and organization climate. It is a well developed concept, implemented from a very early stage in

leaders' experience; they are routinely and systematically exposed to this feedback written by all relevant subordinates. Every leader in every rank receives this annual analyzed feedback on his strengths and weaknesses as a leader, a warrior and a human being. The feedback, which is analyzed by a professional sociologist, offers important information to the leader on his leadership style. A comparison to the average equivalent leader is provided so that one can understand whether he is above or below the average. The information produced is provided also to the officer's commander, who in many cases analyzes the information together with the interested officer in order to achieve better understanding on the insights that the feedback provides. Moreover, the analysis of the feedback contributes to the evaluation of the leader, though with caution. In some cases, the feedback might also be discussed when promoting someone. This gives the feedback mechanism an extra weight, and therefore contributes significantly to the quality and speed of the education of a leader.

Let's discuss as an example a statement that General Peter Pace, the United States' Chairman of the Joint Chiefs of Staff, made on several public occasions. He said that he strongly believe in leaders who "lead by example." But how can one tell if indeed the commanders, under his command, lead by example? We believe that the feedback mechanism provides the answer. If all the officers under the command of all battalion, brigade or division commanders rate the aspect of "leading by example" and write comments on this aspect, then the information obtained through this anonymous feedback would be produced, with a comparison to the average of the commanders at the same levels. If this system is adopted, a few significant things might happen. First and foremost, leaders would be much more aware of their leadership style, e.g. "lead by example." Then, probably, those leaders who need to transform their behaviors would have the clear option to do it more rapidly and more efficiently. Lastly, those leaders who would not

make the desired transformation would be easily identified. "Leading by example" is only one case; loyalty, strategic thinking, analytical skills, professionalism, dedication and others aspects can be also assessed through the feedback mechanism.

Certainly, there are some weaknesses in the feedback mechanism. The most significant one is that the feedback can become the be-all and end-all; it might be used more as a sorting tool rather than an improving and mentoring one. Therefore, the feedback mechanism should be used with high caution; it is a mirror of different perspectives on one's leadership styles, yet only a mirror, and, necessarily, a subjective one.

As mentioned before, this is just a glimpse of this mechanism. In order to adopt this tool, there should be a thorough analysis of the way the concept and the techniques should be implemented in each organization. Nevertheless, after decades of experiencing this system, it is considered by many as one of the important contributors to the IAF leadership style and consequently to the IAF culture and achievements. The approach of the feed-back mechanism is both cautious of possible unintended consequences and accepting of the risks, for the value that the system brings to the organization. This is a way to approach a complex system, establishing control parameters and being aware of possible non-linear outcomes.

Complex and Complicated systems

Another relevant observation refers to the difference between *complicated* and *complex* systems. A system is defined *complicated* when it is possible to know all its components and their relationships, and to forecast its behavior. Building a bridge may be a very complicated endeavor, but it can be scrupulously planned and executed throughout, knowing all relevant factors and their interplay. Complicated systems have many elements, usually simple ones, linked by linear relationships and generally serial ones; they are highly predictable, with no

evolutionary capability and with low redundancy and resilience. Large software, administrative procedures, satellites launches are just some of the examples.

A system is defined as *complex* when it is impossible to know all its components and their relationships, much less to predict its behavior. It is not possible, for instance, to predict what conversation your son will entertain today. Complex systems have many elements as well, but these elements are often complex themselves. Their relationship is non-linear: the likelihood of forecasting behaviors and controlling output from inputs is very low. Processes are usually redundant, connected in parallel, and a single process is seldom critical; and, as we have seen in the communication discussion, a complex system is usually very robust. Examples of this category are ecosystems, the economy, our brain, a human society or organization, and even a group of friends.[73]

The issue of resilience of complex systems is a fundamental one. While a grain of sand in the wrong place can stop the linear mechanisms of complicated systems, the networked redundancies of complex ones make them much more resistant to disturbances and damage, even major ones. The earth's ecosystem has endured much disturbance by humankind without collapsing, so far, just as a human body can endure and compensate for many injuries and mistreatments. An example, despite the fact that most of Internet's physical infrastructure was disabled in a large area of the United States due to hurricane Katrina, the rest of the country's internet operations didn't suffer any appreciable downgrade[74]. It appears that the more decentralized, information intensive the environment is, the more robust and adaptive it becomes. In fact, complex systems have strategies to neutralize errors, and sometimes they take advantage of them. In the complex status between immobility and chaos, they adapt to errors and sometimes use them to improve: life uses copying mistakes in the DNA transcription to create

mutations leading to evolution. The oyster neutralizes the intruder transforming it into a pearl. Curiosity may have killed some cat, but fed all the other ones. Nature as a system is error friendly. We feel these ones are relevant considerations for our leadership issues.

Leadership and Collective Action: A Strange Attractor?

To transition from this cursory exploration of concepts about the new science of complexity to leadership applications, we return to our Lorenz's strange attractor, the first graphic representation (figure 1) of a "relatively simple" complex system: the convection of heated gas in a box. The graphic describes the possible states of the system plotted in a three-dimensional space, defined by some non-linear laws (equations[75]), governing the evolution of the single variables with respect to a parameter (time, in Lorenz's case). Setting the three equations in a system establishes interrelations among them, and from those relationships an order emerges: plotting the possible states of non-linear processes (in our case its evolution through time) can allow emergence of a coherent and organized pattern. If the system has many variables, and actual complex systems can have thousands, millions of processes, the plotting should happen in a "space" of many, thousands, millions dimensions. With some fantasy, we can conceive this hypedimensional space, but we cannot draw it. The "region of the space" where processes are "attracted" because of their mutual influence relationships is the attractor. Not all the non-linear systems have attractors, nor can we plot many of them[76]. However, complex systems that show some regular pattern of behavior do so because something attracts them to it. This something emerges from the relationships of the processes, and there may be many "somethings," many attractor points for a process[77]. We do not know why and how non-linear systems acquire their extraordinary dynamic order. We know that this happens, and so does in

human organizations. Furthermore, we think that the major attractor in human complex systems is exactly the object of our quest: leadership.

We actually believe leadership qualifies as a major attractor force, establishing links among human non-linear processes in such a way to determine the effectiveness of the collective action. We have previously discussed how we can leverage inherited traits of social behavior and compensate for our "narrow mind" to promote effective leadership, and we noted how the interaction of cultural drivers can orient that effectiveness. This leveraging, orienting, interrelating is the fundamental leadership function, together with the cognitive ones of decision making and information processing for one's own people. The model we will later propose integrates our understanding of these functions to achieve an agile and effective collective action, capable of consistent results in the VUCA*R* environment. That graphic, descriptive model resembles the plotting of a strange attractor. Leadership is its underlying force, creating order out of non-linear human processes, orienting them toward the goal of the organization and "attracting" the process in a coherent whole through influence on the relationships among nodes, their functions, and in the end on communication. Meanwhile, we need to discuss how the awareness of complexity theories focuses us on fundamental concepts to exercise that leadership.

Complexity and Leadership: Predictions and Actions

"There is no substitute for a sense of reality" - Isaiah Berlin

In and Out of the Box

We will now refer to human complex systems, the object of our study. The first relevant concept emerging is that complex systems are very hard to predict even in the short term, and impossible in the long term. In order to get to the best possible approximation, we must educate our "narrow mind" to compensate for our inherited weaknesses and exploit our strengths, so as to broaden its capabilities to understand complexity, as we discussed previously. We must also use methodologies to ensure we decide and act in a way optimized for VUCA*R* environments and that we do it consistently. For that purpose, we will later propose our aforementioned specific model. However, before all that, the deep understanding of this concept must give to us an immanent humbleness in the approach to complex problems. As we have seen in our discussion "on the other side of complexity," so far the trend to deal with non-linear problems through our industrial revolution linear thinking has been the widely prevalent mode of operations.

An interesting way to address this dichotomy is Dr. Paul Davis' Complicated-Complex matrix,[78] in Figure 2. The matrix allows a visualization of the possible thinking modes confronting problems other than simple ones. On the horizontal axis there is the nature of the problem, while on the vertical one is the logic set utilized; both can be complicated or complex and the combination of the logic used to confront what kind of problem gives indications about the adequacy of the approach.

In. Davis' words: "The boxes in lower left and upper right are the proper matches. Too often, we tend to operate in the lower right where we fail to recognize the issue or the problem is actually complex in nature and we try the methods we are expert at addressing complicated

problems. It is like trying to fit a round peg in a square hole. Additionally, if we mistake the relationship and find ourselves in the upper left box, we are making more of the problem than it is."

Figure 2: "Davis' Matrix" -- Fitting the Solution Logic to the Problem

	COMPLICATED	COMPLEX
COMPLEX	OVERKILL	APPROPRIATE
COMPLICATED	APPROPRIATE	INADEQUATE

RESOLUTION LOGIC SET

NATURE OF THE PROBLEM

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Following on the issue, Dr. Davis notes, "Complicated issues/problems can be reduced to their parts; those parts can be examined and corrected as individual entities and then reassembled into a fixed or better whole. I like to call this "in the box" thinking. However, complicated issues/problems are all about the relationships. [79]. Their resolution is not to be found in the parts but in the relationships among the parts and this is always changing. Davis' Matrix is designed to do nothing more than show the problem we are encountering due to a misunderstanding of the nature of the problem we are facing. We seem to use the words *complicated* and *complex* interchangeably, and they are not interchangeable. The resolutions to complicated problems can be determined in advance. If studied properly and enough is known about the issues, a course of action can all but guarantee success in advance. Additionally, the resolution of complicated

problems is repeatable. None of this is so with complex problems. Although complex problems often seem to subscribe to the same management that we use for complicated problems, in reality this is simply happenstance."

We have once more seen how approaching complex problems through linear thinking is a recipe for failure, as hindsight so often confirms. On the other hand, our mind is driven by the emotions resident in our inner, ancestral brain we share with our fellow animals and the narrowly focused linear thought processes of the cortex, our new, powerful survival tool of intelligence. We can broaden our cognitive capabilities through specific cultural training and awareness, but how do we bring to bear our inherently linear thinking on complex systems?

Again, we can leverage our true competitive advantage: our extraordinary cultural adaptability. We can redesign our mental software to make our way of thinking a system itself: a cultural complex system, adaptive, resilient, error-friendly, intensely informed and highly communicative, and attracted in a coherent whole by a clear paradigm: the one we need to build for the new millennium, and to which this work is attempting some contribution. Confronting complexity through a mindset shaped to enhance the complex system characteristics of culture is the idea. The broad, multidisciplinary education we (among many others) strongly advocate strives to build a network of concepts, understandings and connections capable of adapting and evolving to frame complex issues and of understanding its own limitations. Moreover, a *network of minds* so educated becomes a powerful complex adaptive system itself. We do need engineers, for sure, and their extraordinary capability to solve complicated problems: but we need also a new way of thinking to frame all our necessary and precious linear cognitive endeavors in a holistic framework. Our engineers, and all other agents of our collective action, should be able to

solve complicated problems understanding complexity, to avoid falling in Davis' wrong box. Let's look into this concept.

Is Complexity in the Eye of the Beholder?

Observing complex problems, an aware eye can make out different kinds of processes. There are linear processes, the ones that usually get most of the attention, because they are "comfortable;" there are non-linear processes and, we would say, "quasi-linear" ones, of which we can understand much but not all. All these are usually interconnected in a complex whole. It also appears that sometimes, through extensive use of communication and information, some of the complexity can be reduced to be "just complicated." It's as if there was some kind of a quantitative threshold dividing the complex from the complicated, the quantity being information. We think there is also a qualitative threshold, which prevents predictions regardless of how much information we pursue, and makes things complex.

To deal with this composite reality, we believe it is first necessary to learn to "think big" and to be aware of the "nature" of complex issues, as we have previously discussed. Thereafter, we need to try to transform complex problems in complicated ones through information and knowledge as much as possible, knowing that we will not be able to capture all relationships and consequences. We must at the same time apply some specific thinking patterns for the complex whole, and approach the complicated problems we could single out in the big picture through our sophisticated linear thinking. Sophistication is certainly necessary to understand and solve complicated problems. A higher level of sophistication, or (and often, and) an extraordinary intuitive capability and some luck are necessary to solve complex problems. In our previous discussion about the "nuts and bolts of strategic thinking," we pointed out some of the thinking

know how available for decision making. We now want to propose some ideas about the specific thinking patterns to apply to the "complex whole" to assist our leadership.

A "Statistical Approach"

Statistics are an old way to extract information from complex systems. What a single person may not perceive from the individual perspective becomes clear when data are aggregated in large numbers. From a single person's experience, the needs for safety belts when driving may never become evident, as he or she may never get involved in a car accident. Looking at the appalling statistics of road accidents, few (stupid ones) deny their necessity. The impossibility of keeping track of an extremely high number of processes leads to track only some major indicators thereof, which can be of great use for specific purposes: statistics are born.

Furthermore, we have seen how from complex systems and their non-linear processes often some kind of regularity emerges, and not only through the plotting of strange attractors. In many science museums, we can observe the fascinating randomness of little balls falling and bouncing behind a glass trough a perfectly regular forest of horizontal nails, to come to a rest on the bottom in a totally unpredictable position. The interesting thing is that, after a number large enough of balls have fallen, you can see they always pile up following a most regular Gaussian curve. You cannot predict the single fall, but you can anticipate the overall pattern of the balls distribution. Many of different regularities can be discovered in complex systems.[80]

We do think that, because of their capacity to capture relevant information, statistics can yield a significant help to the strategic leader if they are used appropriately, the right questions asked. But this is not the point we want to focus on. The point is that where linear processes alone are not enough to guarantee overall success, as in complex systems, we must bring

something more to bear on the goals: in a sense, we must work the "statistical nature" of complexity. How do we do that?

It is *likely* that the broad education we are discussing -- aware of the characteristics of complex environments and of human limitations -- might support better decision making for leaders on complex issues. We cannot predetermine the single decision making process, but teaching leaders we can operate on a *control parameter* to statistically influence the outcome. We will maintain the term "control" used in some literature intending the attempt to influence, and not any belief in a deterministic capability to control complex events. As we have previously seen, a control parameter does not operate in a linear way and most often we cannot predict exactly how it will work. However, if it is a good one, it does influence effects.

On the same path, building a strong network of leaders educated both on leadership and on complexity helps to make a decision making system more "adaptive, resilient, error friendly, intensely informed and highly communicative, and attracted in a coherent whole by a clear cultural paradigm," which is how we previously defined our desired leadership mindset. The "network of leaders" control parameter, difficult as it may be to achieve, is a very powerful one, because of the synergistic effect and the motivational hyper-cycles it can trigger throughout the organization. Leadership of leaders is the critical element to make it happen. It is a strong attractor, we would say, and such to demand a radical shift of emphasis on leadership development, mentorship and application, from *the* leader to the *network of leaders*.

Many others avenues can be found to operate control parameters capable to statistically influence complex systems. We will look into some we believe to be fundamental ones, to give an idea of how the approach works.

ETV – Environment, Trends and Vectors

"What everyone knows is what has already happened or become obvious. What the aware individual knows is what has not yet taken shape, what has not yet occurred. Everyone says victory in battle is good, but if you see the subtle and notice the hidden so as to seize victory where there is no form, that is really good."-

Sun Tzu, The Art of War

The very first capability a leader and the network of leaders should bring to the decision making process is the ability understand the environment and its trends and vectors. Environmental scanning is deemed a fundamental leadership step. We have seen how to be able to scan effectively the VUCA***R*** environment; we must acquire, mentor and connect as much as we can of our "broader mind." Through its use, we must be very perceptive of the stability and evolution of the system we are dealing with. Perceiving the "fluctuations" that point to some longer-term trend, or at least the trends themselves once they start to move, is very important. Moreover, on a shorter time scale, it is fundamental to understand rapidly shifting vectors, faster fluctuations capable of contributing to divergence and the instability leading to change. Environment, Trends and Vectors (ETV) describe the typical behaviors of a complex system, where fluctuations are stabilized by negative feedback loops, until change or disturbances lead to a critical point where instability and eventually change occur. Again, it is not possible to keep track of all phenomena taking place to shape ETV. However, striving for the big picture, choosing relevant indicators, asking good questions, can yield good data and information, and our evaluation can turn those in the knowledge we need. The process of doing so through the framework of a perceptive "broader mind" educated to self-awareness, and complex systems dynamics is the closest thing to wisdom we can think of.

Risks and Opportunities

"A superior pilot is the one who uses his superior judgment to avoid using his superior skills."

"He who wins in aerial combat is the one who makes the least mistakes."

"If you cannot defeat his airplane, defeat his mind."

"Never underestimate the enemy."

Common fighter pilot wisdom

Let's think of Joe Whoever, being kind to his neighbors, or providing for an education for his children. Let's think of a fighter pilot entering the air-to-air arena in his formation, to kill the enemy. Let's think of leaders leading their organizations, or of any strategic choice. What do all these situations have in common? Basically, all have a fundamental pattern for confronting complexity. Each of those actors has goals to pursue in his (or her) complex environment, be it life, flying and fighting or decision making and action at the strategic level. Each uses *some* of a strategy we are going to discuss briefly, to make it explicit and turn it into a reliable tool for a consistent approach to complex environments.

The point is that the great difficulty of understanding fully and predicting the many dynamic processes of complex systems leads to a "statistical approach" to action, rather than to cognition. What emerges powerfully both from our conceptual approach and from practical experience is again the necessity to act on control parameters that influence the system, rather than confiding in linear, discrete input-output relationships. Clearly, the capability to invest in initiatives that go beyond immediate benefits for a greater good and with results hard to quantify has been the essence of strategic leadership for a long time, and its importance, though often neglected, is not a discovery of ours. However, we think it necessary to introduce a category of action that must be continuously pursued by strategic leaders, and ideally by all members of our

organization, when dealing with complex environments; i.e., most of the time. This kind of background activity must be "turned on" as soon as possible in a leader's career, and possibly kept on at all times until it becomes second nature, since it operates on complex systems according to their characteristics: it establishes a constant "communication" of calibrated inputs oriented toward establishing control parameters favorable to the achievement of the goals. We call this category of action "Risk Mitigating and Opportunity Seizing and Seeding." It is not just, as it may sound -- a "nice-to-have" prudent inclination to be safer; it is a highly proactive, fundamental approach to influence complex systems through their own workings. Feeding the environment a constant flow of communications, organized in a system of strategic choices and a myriad of aligned smaller ones, can establish a "critical mass" of relationship exchange, a system of control parameters capable of influencing a significant portion of the context. The concept "system" of control parameters, of inputs, of communication, informed by Mission, Vision and Strategy, is central to our approach. It connects tightly to the "systemic thinking mode" strategic leadership requires.

While the quantity and pattern of the communication is important to engage the target system, its content is obviously critical. The basic question that we must answer to shape our system of communication is then about form of the transaction and value transacted. To define those parameters in a functional way, leadership comes into play through its fundamental messages, which nowadays are usually synthesized in organizations through Mission and Vision.

Identifying and implementing the Mission and the Vision of the organization defines the goal and the desired collective identity of the team, and this is relevant both for building effective collective action and to inform the relationships with the external environment. Doing so effectively requires clarity, consistency and synergy: clarity, for people to understand easily

and deeply the message; high consistency in carrying it forward through time and situations; and a rigorous synergy such that every action carried out must have confluence toward implementation of Mission and Vision, or the latter need to be changed. If leadership is the fundamental attractor force for the effectiveness of collective action, Mission and Vision can become the powerful attractor points for the whole system, shaping form and value of internal and external exchanges.

So, how does Joe Whoever mitigate risks and seed opportunities? He knows by experience that in the complex environment of life, you cannot control what happens around you much at all; but he also knows that some behaviors, *statistically*, influence that environment. He knows that if he is kind to people, *likely* they will be kind to him, and the *likelihood* of unexpected hostile behaviors is reduced. He knows that, likely, a good education helps in finding a good job, even in a complex and unpredictable place like a market economy. His personal "Mission and Vision," probably an unstated expression of his beliefs and values, make him shape the form and content of his "communications" with the environment, through a positive attitude toward his neighbors, and transacting dollars for his children's college. He doesn't know whether his investments will yield success; nevertheless, he is thus mitigating risks and seeding opportunities, through good control parameters capable of some influence on the environment.

A fighter pilot inbound to a big aerial battle is certainly facing a VUCA*R* environment *par excellence*, even in a high-tech aircraft. In a "multi-bogey environment"[81], he cannot be sure of how many enemy airplanes there are and of their position. He knows the enemy will do anything to deceive him, counter his tactics, defeat his weapons and kill him. Things evolve in a very fast way, considering the high relative speeds and the maneuvering involved and combat can express all its fierceness in a very dense few minutes. If engaged in a dogfight, his situational

awareness shrinks suddenly to his near environment, and under the huge physical stress of high Gs, focused on killing and surviving, high adrenaline flowing, his information processing capability shrinks as well. The unexpected is the norm, and VUCA***R*** is the name of the game.

This is why a fighter pilot works on control parameters to influence a complex process. The first one is culture: he must be humble, aware of the limitations of his system (man, machine, command and control); he must know his trade very well through hard and long training; the environment and the enemy through study and thought; and understand trends and vectors thereof. Then, he must have plans in mind to shape the battle, or channel the enemy in options of least regret. He must be ready, again through high quality training, to perceive immediately and act proactively upon emerging threats and opportunities, deciding in the effective time available, implementing decisively and reassessing his decision, to feed back into his understanding of the situation. He must know how to work as a team with his wingmen, in a disciplined but decentralized way, where role and responsibilities shift according to the tactical situation, again to counter threats and seize opportunities in the most swift and effective way. Then, he needs a very good command and control, plus on-board systems that give him the best possible situation awareness. He also needs, possibly, a good airplane. His tactics will try to maximize seeing and not being seen, killing quickly and separating from the fight to avoid exposure. Briefings and debriefings maximize focus and feedback for reassessment. The synergy of all these actions enables our pilots to seed opportunities and mitigate risks on a vast scale, and with an extremely high rate of success.

We could go on for a long time yet. But the basic point is that in attempting to control a very complex, uncertain and rapidly changing adversarial process such as an aerial battle, there is no "silver bullet," no "Great Ace," and not even the "super-high-tech fighter" that can work

alone. To ensure success, a wide set of control parameters must be exercised: culture first and foremost, training, organization, technology and more. Those, together, give a *statistical* answer to good questions. Understanding which and what these parameters are and working the right set in a holistic and self-assessing mode, explains how the highly non-linear world of aerial combat has seen the absolute dominance through time of the "Complex Adaptive System" of the fighter community of the western countries.

Leaders operate in many cases like Joe and our fighter pilot, in an intuitive and often very effective way. We think it useful, nevertheless, to highlight the relationship of risk mitigating and opportunity seeding with the nature of complex systems, to make it into a thoroughly thought out and implemented strategy to influence complex processes. Our leadership model, provided very soon, is very much based on this approach, and in the next chapter we will see a practical example of it.

The Hunter, History and Hyper-cycles

The threads that from the complexity theories lead to leadership issues are very many, even through a cursory outlook such as ours. This is because leadership is by nature interacting with and trying to influence complex systems. Unfortunately (for us, we are not sure about the reader), we must limit our discussion to just one other fundamental consideration. We have seen in the previous chapters how our evolutionary path, our ancestral hunter's heritage, has determined our social nature and the cooperative, decentralized leadership style we need in order to be able to operate effectively in our organizations. We will later see how history tells, establishing varying degrees of success or failure, when social, political and economic systems align with our nature or diverge from it. We think that another acknowledgement of this school of thought comes from our discussion of complexity theories. We have seen how Complex

Adaptive Systems, the effective ones between stillness and chaos, are highly decentralized, composed of many elements networked by an intense exchange flow. They are governed by form and content of this communication, which has a critical role, much beyond the nature of its elements. When these systems are centralized, the exchanges tightly controlled and restrained, they degrade in performance until eventually they collapse, because of stagnation, of emerging disequilibrium and external pressures. If rather the form and content of the exchanges are excessive or unbalanced and inadequate to inform the system, it may fall into a chaotic state, like in social turmoil or in the development of cancer. Otherwise, when the information flow is good, these systems usually self-organize in seemingly necessary hierarchical levels, still maintaining the intense horizontal flow among the elements. They become robust and resilient, in that when a part of it is degraded, or elements disabled, its decentralized, self-organizing nature makes other elements and parts of the system pick-up functions and rebalance the communication flow.

We have seen this at work in good military units in battle, in the internet in presence of major disruptions, in the economy if some fundamental rules of the game are in effect, in nature in many cases, some of which we discussed previously, while many are examined in the references and other literature.

We have seen how Complex Adaptive Systems work their intensely dialectic evolution through a dense network of communication, where many sub-processes feed back into each other, often reinforcing the output, in hyper-cycles capable of building a new order through critical bifurcations. We think that leadership, the attractor force for collective action, can and often does activate and diffuse the strongly self-reinforcing behavior of hyper-cycles of various kinds: first and foremost, the motivational hyper-cycle that such extraordinary results yields in human organizations, if and when its powerful chain reaction is brought to bear on shared goals.

When leadership is strong and cooperative and justice and fairness are the norm; when people are empowered and feel part of a team and a clear mission and a shared vision are the attractor point of decentralized action, organizations thrive and evolve, just as complex adaptive systems do.

We do believe that the new science of complexity and chaos, though in its infancy and very briefly examined here, shows an impressive convergence toward what the discussion of our evolutionary roots yields with regard to the effectiveness of the collective action and its attractor: leadership. We believe also that awareness of such dynamics can help considerably dealing with our complex world, supporting its understanding and the modeling of mental processes that can assist us in decision making.

In Part Two, we will connect another important frame of reference to our leadership approach, we have explicitly addressed in our "broadening trends": history. Before that though, we will now apply the understanding so far discussed to our first cognitive model to confront a VUCA*R* environment: the Comprehending-Acting-Leading (CAL) Loop.

Chapter Three

The "Narrow Mind" at the 21st Century's Doorway – The CAL Loop

"It would be naïve to think that the problems plaguing mankind today can be solved with means and methods which were applied or seemed to work in the past"

Mikhail Gorbachev, 1987

We have seen how there is a growing gap. On the one hand, humans are equipped with social skills apt to small group dynamics, and with a "narrow mind" that pursues understanding of the world through emotions and linear processes; on the other hand, reality becomes more and more complex: mega-organizations, crossed by a huge information flow, in a world that changes quickly. To confront complexity we are forced to make the best of our resources, through the awareness of the nature of the challenge we face and the best possible exploitation of our linear logic, providing for it software that can help bridging the gap. The model we propose, The CAL Loop, is of this kind; *The CAL (Comprehending-Acting-Leading) Loop* is a cognitive, systematic method to assist leaders in dealing with complexity and uncertainty. It pushes leaders to seek for the "broad picture" and at the same time to scan and sense tactical challenges; to understand external influences and to be Mission and Vision focused internally; but maybe most importantly, the cycle pushes the leader to take the initiative, to mitigate risks, to seed and to seize opportunities, and always to act proactively. However before proceeding with our discussion, we want to highlight how the model should be implemented: since the beginning of a future leader education.

"We teach them to be by the standard" was one general's answer to a question regarding principles[82] used for the education of air cadets. However, out of these air cadets the next

generation's strategic military leaders will grow up. This concept raises a question: is "teaching the future leaders to be by the standard" the right way to educate them? If so, should it be the only way? Our approach and our strong belief is that leaders should adopt concepts and techniques leading to a strategic perspective from very early stages in their leadership experience, so that they can use it early on; moreover, learning these techniques from the early stages makes them become second nature. Arguably, while the level of leadership (strategic or lower) is determined by the breadth of the picture, the amount of information and of the frames of references utilized and the stakes involved, the quality and principles of the thinking process are consistent across all levels. Therefore, educating leaders and especially future leaders to adopt and practice concept and models that can assist them in "narrowing the gap" is crucial. It is our strong belief that methods, concepts and cognitive models, as the *CAL Loop,* are useful assets since the beginning of a leader's education and training.

Lincoln, one of the most respected of the American presidents once confessed "I claim not to have controlled events, but confess plainly that events have controlled me"[83]. In consistent with the statistical approach, provided in previous chapter, this will always happen in some measure. But we try to establish a leadership practice that promotes an agile and proactive leadership style and decisively pushes leaders to act and let their counterpart react.

There are some good attempts to define and to comprehend the initiative-based decision making process. For example, the OODA loop[84] (Observe, Orient, Decide and Act) is one of the attempts to define a routine mechanism toward agility and adaptability; the PDCA model[85] (Plan, Do, Check and Act) is another systematic decision making technique. Nevertheless, we believe that *The CAL Loop* takes the concepts provided in these models at least one step ahead. It forces to proactive approach and broadens links before acting. Moreover, *The CAL Loop* is part of an

overarching holistic model, *The C2PS (Confronting Complexity Proactively and Systematically) Model* that enables the organization as a whole to confront complexity in a systematic, proactive and holistic approach. *The C2PS Model* will be provided later after our analysis of the organization's goals and challenges. Let's first discuss *The CAL Loop*.

The CAL (Comprehending-Leading-Acting) Loop

The CAL Loop is a logical analysis-synthesis method that enables a leader to have a holistic and proactive approach to understanding and acting in accordance with the main organization's responsibilities. The cycle has six main phases—Understand, Invent, Identify, Prioritize, Implement and Reassess -- that have to be regularly overviewed. In essence, these phases should be the heart and soul of the decision making process of a leader, at all levels. Each phase has its own uniqueness, which will be described. The time required to complete a cycle varies depending on the complexity and the level of operation, the stakes involved and the time available to solve the problem; in some cases the cycle might take days, weeks or even months, but there are situations where only minutes or even few second are the given time to completion. To update our evaluation and keep extending leadership effects to a distant time horizon, frequent iteration of the cycle should be used, especially at the strategic level. However, the most important aspect to understand is that all the phases should be Mission and Vision focused. Analysis and action in any phase should be according to the mission and vision of the organization, and consequently it should determine the strategy of the organization.

Figure 3: *The CAL Loop.*

Understanding Environment, Trends and Vector (ETV)

The cycle begins with the Understanding ETV (Environment, Trend and Vectors) phase. This phase analyzes the overall environment, to achieve the so-called big picture, in which one strives to include all relevant factors: history, actors and their relationships. Trends refer to the major evolutionary processes, taking place in the environment, including social, political, economic and cultural ones. Trends are to be carefully considered, since they may be a shaping force for the future, and triggers fluctuations. Sensitivity to vectors -- shorter term, faster and less predictable likely outcomes -- is also important. Vectors affecting the organization and its near environment are especially critical, because they can disrupt the equilibrium of the system and may bring forward threats and opportunities. Trends and vectors are significantly important to

understand the possible evolution of the broad picture and of the particular situation. However, defining the relevant trends and vectors remains a personal judgment of leaders. To form that judgment, leaders need to develop the "Broader Mind" we have discussed chapter one. Without that development, the chance to be able to understand the environment and its trends and vectors decays enormously.

Thorough scanning of ETV, in the light of one's own or the organization's Mission and Vision, enhances a holistic understanding of the situation, both internally and externally. This phase sets the tone of the next phase in the model, which basically pushes the leader to initiate, to act.

Invent the Future or Channel the Counterpart

Sunday, June, 7 1981. Eight F-16 fighters are heading eastbound from a southern Israeli base. Their mission has never been done before: destroying the upcoming "Osirraq" nuclear reactor located near Baghdad. In less than one hour, the mission was accomplished, and Iraq did never gain nuclear capabilities. Environment, trends and vectors analysis regarding Iraq was thorough, prompted by an unpredictable hostile country that sought nuclear weapons in order to threaten Israel's existence. Now, in retrospective, the preventive attack seems the right thing to have done, but back then in 1981 it was a tough decision. After endless discussions about this act, considering a wide range of issues that could be affected by this attack, Israel's government decided to do it; even the timing – Sunday – was chosen in order to minimize the collateral damage and the number of casualties (Iraqis and foreigners who worked at the reactor site). It was a tough decision, but the environment, trends and vectors were eventually clear; therefore, with all its complexity and risks, the deep understanding of the ETV convinced the Israeli government to choose the option of shaping the future, being the first to act. We believe that in a

VUCA**R** world, the higher chances for success are when the principle that "the best way to predict the future is to invent it"[86] is a leading one. Act and let the other react, is usually the best approach to strive for. Obviously, as we have seen, the deep understanding of the internal and external situation is the enabler of a proactive approach. The concept of inventing the future is well explained by Keith H. Hammonds: "You can win by using any of those methods but only if you do one thing more: Outmaneuver the other guy. You have to decode the environment before he does, act decisively, and then capitalize on his initial confusion by confusing him some more. Agility is the essence of strategy in war and in business."[87] Therefore, try to initiate as much as you can.

However, it would be naïve to think that you can always invent the future. When inventing the future does not apply (due to lack of resources, capabilities, opportunities, etc.), the fallback option should be to try to channel the counterpart, the enemy, to areas where your military has better answers or to areas where the threat to your nation is less dangerous or less imminent. In complex situations, the cause-effect relationships are not direct, so a proactive fallback capability is necessary; an agile organization should seek to continue to hold the initiative and try to channel the adversary.

The Israeli and Syrian military strategies post the 1973 (Yom Kippur) war, when Israel was under a clear and present existential threat, can be understood through this lens. After the 1973 war, Israel's main objective was to channel the enemies, including Syria, to develop a strategy that would be less risky for Israel. The IAF, in particular, learned many lessons from that war. One main lesson was that he who controls the air will eventually control the battle; therefore, the post-1973 IAF tried its best to strengthen its air dominance capabilities. Nine years later, in 1982 during the Lebanon war, all these lessons were translated into a unique success, in

which the air clashes between the IAF and the Syrian fighters ended with 82 downed by the IAF vs. 0 losses. The initiative taken after the 1973 war along with the success in 1982 has channeled the Syrians to change their strategy: from traditional strong Air Force power (based on fighters) to one mainly focused on achieving asymmetric capabilities (based on both surface-to-surface missiles and support of terrorist activities). Although Israel has to face the asymmetric challenge since then, this is by far less risky then the imminent one Israel faced during the traditional nation-to-nation war, like the 1973 war. The asymmetric Syrian threat causes casualties on the Israeli side, but it is no longer an existential risk for Israel, as it was in the first days of the 1973 war. Israel channeled its enemy, Syria, to neglect its traditional, Soviet-oriented military strategy and to focus toward asymmetric warfare capabilities. The Israeli strategy since 1973 can therefore be considered as a successful one.

Identify New Threats and Challenges

But, in complex systems, things don't always go as planned. In many cases even an initiative-oriented military doesn't have the privilege to affect its adversary's new threats. This is the main reasons why every organization and every leader should have good systems to detect new threats and opportunities as soon as possible after or even before their appearance, and address them. There must be a readiness in the organization and in the leader's mind to perceive new threats or unplanned opportunities, and when they occur, to sense them and to analyze them. The analysis of new challenges should be in accordance with their potential relevance on both the organization Mission and Vision and at the same time within the context of the environment, the trends and vectors that were indicated in the "Understanding ETV" phase, *Identifying new threats or new opportunities* is therefore the next phase in the cycle.

In order to have an agile organization that identifies new threats or opportunities in a useful period of time, the organization must have good sensors, i.e. intelligence. In a way, the Israeli bad experience in 1973 (Yom Kippur) war, is a monumental evidence for the need of good sensors and relevant and reliable intelligence. As a consequence of that experience, much was invested in this function. Today, many of the IDF operational achievements are driven by the good Israeli intelligence capabilities; moreover, even in times of budget cuts, the intelligence pillar of the Israeli military is untouchable.[88] However, good sensors and intelligence are not enough; an organization must have a culture of openness and real willingness of leaders to seek for bottom-up insights. The leader's willingness to hear new things and different points of views is a major contributor to the organization's ability to become agile and adaptive. Yet, many leaders don't confront this phase decisively, some because they don't realize its importance, some because they don't encourage or believe in bottom-up processes and many neglect this important aspect because of the risk of being overflowed. We believe that this phase, diligently and prudently carried out, is crucial for the success of both the leader and the organization in the VUCA*R* environment. The concepts of collaborative problem solving, critical thinking and collective ownership[89] of the outcomes are significantly important to achieve a prudent and productive phase. Leaders should strive to perceive new threats and new opportunities in order to stay relevant; therefore they should encourage their subordinate to bring new ideas and information to the table. However, the issue of being overwhelmed is a delicate one to solve; this is a great challenge for the leadership, especially in the information age where any new finding can be sent to the leader immediately just by clicking the mouse. There is no magic answer to the overflowing risk; nevertheless, we think that "balancing" is the appropriate approach, meaning that as a leader you have to be aware whether you are overflowed with unimportant information

or you don't receive the information in a relevant period of time. If you find yourself mostly on one side (i.e. overwhelmed or not updated), then you need to rebalance your inputs. In order to be able to respond and act effectively, it is better to be slightly overwhelmed in order to stay updated and adaptive.

But, there are many cases when the threat or the opportunity is not identified and event happens unexpectedly -- Irregular event. In such cases, and consistently with our approach we offer a sub-model that deals with the ability of a leader to "proactively react" to irregular event[90], We will address this issue in the next chapter, "Reacting Proactively" and in Appendix 1, we will discuss in depth the reactive side of leadership.

Identifying the threat or the challenge is necessary phase but not a sufficient one alone to adapt and to respond adequately. The next two phases in *The CAL Loop* are the core of the decision making process. They synthesize all the data, prioritize the challenges and the answers and implement them. Let's discuss first the *Prioritizing* phase.

Prioritize Challenges and Answers

The main goal as a leader is to provide the best possible answers considering the Mission and Vision of the organization, the environment, trends and vectors and taking into account the limited resources of the organization, since they can force leaders to prioritize. We recommend prioritizing in a wide array of meanings. First, we think that a leader needs to define and then to communicate whether the organization is in the divergent part or the convergent part of the decision making cycle. If time-to-required-decision allows, stay divergent. If you need to decide quickly, transition to the convergent, synthesis phase; this clarification makes the decision making process more focused on effects, and therefore, more effective.

Then, prioritize the challenges and the answers. There should be a scanning of all the answers available, their approximate contribution to deal with the given challenges and their costs. The outcome of this phase should be a list of prioritized threats, prioritized answers and the required effects to each threat, and the combined prioritized answers. Moreover, because of the fact that in complexity the cause-effect link is not always clear, and in order to seed opportunities and mitigate risks, we recommend including in the priority list the low-cost/low-probability answers that fit in the strategy and in the Mission and Vision of the organization, if reasonable. If they do not cost much and even if they are minor contributions, let's try to do them because they may influence outcomes in a way we cannot see at this moment.

Implement and Communicate

Implementing the decisions is obviously a needed phase, but unlike what could be expected this phase is not just about mechanical execution. This phase has to be Mission, Vision and Strategy oriented as well, both for the communication and the action part; implementation is "communicating-by-doing " and, at the same time, needs communication to be effective. Therefore, as a part of implementation a leader should decisively communicate his and the organization's understanding of the environment, trends and vectors, the challenges in the light of Mission and Vision, and the prioritized answers, his "information processing" is fundamental in the action phase to orient it in the right direction. The more you refer to your vision, the clearer it will become and the more deeply you will understand it[91]. In order to engage those who implement the decision they should understand the broad picture, and should act accordingly, using their empowerment and their brains to achieve the desired results.

Reassess the Situation and the Loop

The sixth phase of the cycle differentiates learning organizations from others. A frank reassessment of both the prioritized answers and their impact on the overarching strategy of the organization, reassessment of the internal method (i.e., *The CAL Loop*) that was used, how effective and efficient it was in the light of the results are absolutely necessary for agility. The "lessons learned" must be identified and "really learned" before beginning another cycle.

Pythagoras once said: "choose always the way that seems the best, however rough it may be. Custom will soon render it easy and agreeable." VUCA*R* environment often presents a leader to complex situations where the best answer is not so clear and the right way is usually blur; therefore, a systematic methodology, that push leaders to seek for the broad picture, to be vision and mission focused and to be proactive, brings higher chances for success. Adopting, from early leadership's stages, a methodology as the CAL loop, is essential. Moreover, we believe that adopting a systematic methodology that is based on the concepts provided by the CAL loop, is relevant in all sides of leadership. That is to say that while the CAL loop emphasizes the initiative side of leadership, a systematic "way of thinking" that deals with the reactive side of leadership is, therefore, needed.

Reacting Proactively

"Future challenge – how to shift from reactive to proactive"

T. Owen Jacobs[92].

Imagine yourself in your office just receiving a telephone call that changes your day, you are notified of an irregular event that just happened in your organization. You have to react. It is both a notable and a perceptible event that has already happened and its outcome may shake the organization and in many cases its core beliefs. While *The CAL Loop* pushes the leader to

initiate, to deliver the answers mainly to potential threats and opportunities, and to implement accordingly; the reactive side of leadership is not addressed. Moreover, although much been written and taught on the active side of leadership, the reactive side, the side of leadership where the leader is pushed to react is somehow neglected. Therefore, we propose *The Five Step Guideline*[93] which deals with the reactive side of leadership. *The Five Step Guideline* along with *The CAL Loop* provides the whole leadership action mechanism (Figure 4). *The Five Step Guideline* is basically a proactive reaction guideline to irregular event and it is a sub-branch of the "Identify" phase of *The CAL Loop*. It completes the leadership action mechanism in both the active side as well as the reactive side of the leadership.
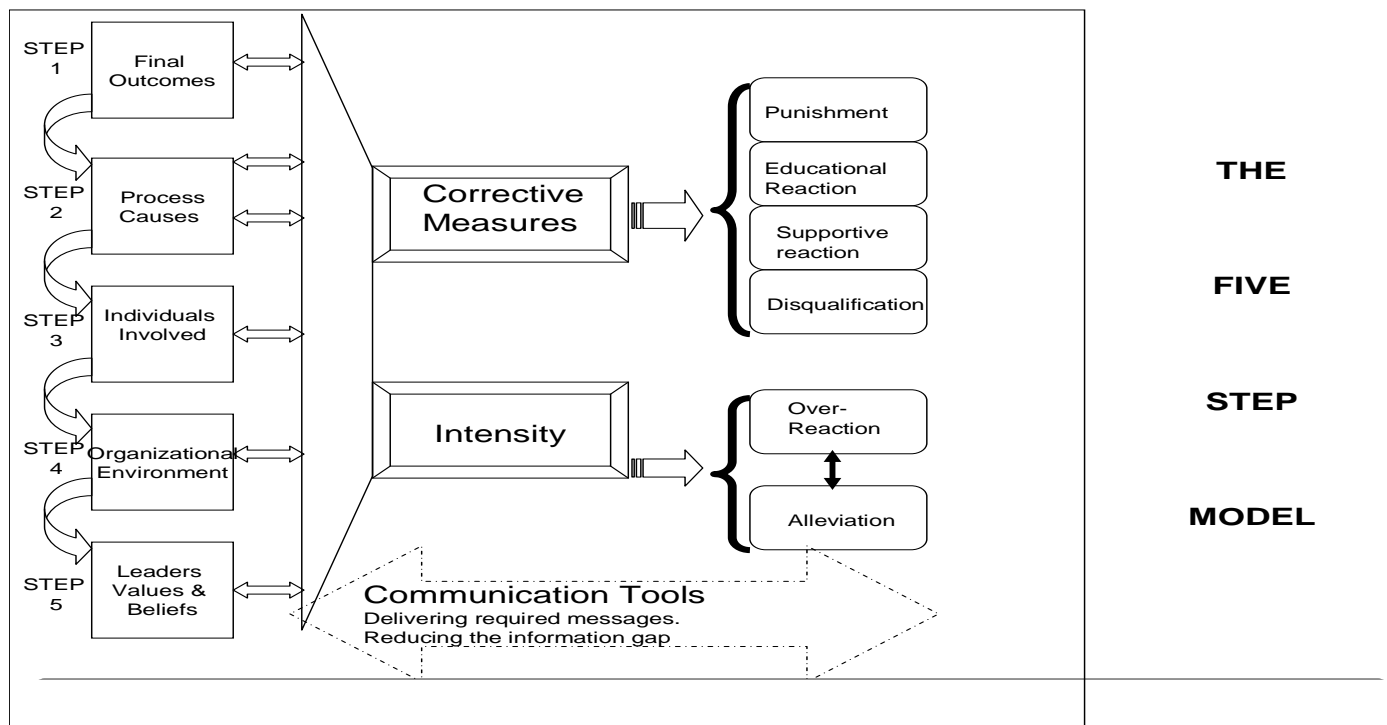
Figure 4: The Leadership Action Mechanism

How should a leader react to an irregular event? What points of concern should be analyzed before responding? What are the reaction tools? And most important, can a leader transform surprising, unplanned and sometimes unpleasant events into opportunities? These questions are all addressed by *The Five Step Guideline.* This practical tool provides a holistic approach to the reactive side of leadership that might help all leaders, especially strategic ones, to adopt a broad and logical approach when reacting to irregular events. While providing a uniform guideline, the model still enables each leader to react differently according to his analysis, encouraging to seize the hidden opportunities and eventually to promote his vision, values and beliefs. Furthermore, if the model, which provides common definitions and methodical analysis, is routinely used, it can significantly improve the communication between a leader and his subordinates. And communication , as we have seen, is a powerful enabling force – integrating *the Five Step guideline* and *the CAL loop*, gives a "system" of communication capable to leverage relevant control parameters, and influence the complexity we are dealing with.

Its holistic approach is achieved by a thorough analysis of the event, which contains five steps of inquiry: (1) the final outcomes of the irregular event, (2) the process that caused the event to happen, including individual and leadership responsibilities (3) the involved individuals' background, (4) the organization's record, history and culture, and finally (5) the leader's values and vision. (Note: Only the concepts and the principles of *The Five Step Guideline* are discusses in this chapter, for a deeper understanding, we highly recommend the reader to refer to Appendix One)

Figure 5: The concepts of *The Five Step Guideline*

Leaders reactions should be and can be vision oriented. The ability to analyze and understand an irregular event and to use it to promote values and beliefs is one of the main skills that elevate a leader to the level of a strategic one. *The Five Step Guideline* provides a holistic approach to the reactive side of strategic leadership; with its five steps, the model provides a systematic analysis that enables a strategic leader to use the appropriate corrective measures at the required intensity. Moreover, the model entails a decisive attempt to communicate and deliver the appropriate vision-oriented messages. "It is hard for us to be consistent when we face random shocks."[94], however, relevant leaders need to be consistent, proactive and vision focused not only when initiating but also when reacting.

Will reality work in theory?

To practice *The CAL Loop*, let's take an example among many: the complex and delicate relationships between an air force base and the surrounding civilian community. It is clear that jet fighter's noise early in the morning does not help quality of life. As wing commanders (in two different countries) we both found very important to examine these relationships and to initiate and act in order to have a positive influence on the environment. Each one of us could neglect this delicate issue and do little regarding the issue, since it is not an operational priority. But understanding the trend and vectors regarding the delicate relationship between the noisy air bases and the quality of life of the civilian society around the bases suggested to both of us to act, to mitigate risks and open opportunities.

A Fighter Base and the Local Community (an Italian Air Force Experience)

From my predecessors I received a good Wing and an excellent relationship with the local community. I had to make the choice whether to capitalize on that and concentrate on several oncoming evaluations the wing was going to have, doing the minimum for the relationship, or keep investing in it. I definitely chose the second option, reinforcing it as much as possible. This choice came because of two main reasons: the absolute necessity to act according to the Vision and the awareness of the VUCAR dynamics of complex systems, to mitigate risks and seed opportunities.

The Vision defined for the wing was: "We intend the Wing as a military fighting unit, a "team of teams" based upon leadership at all levels, on empowerment of people, on quality of everything we do, **to serve the Country**. The "to serve the country" statement indicated our reason of being, and the local community was an important part of it. Considering leadership the attractor force for collective action, and the Mission and Vision the attractor point, they have to

be implemented with clarity, to make them well understood; through synergy, relating all our actions to their meaning, and with consistency, to maintain through time the conveyance of that meaning. Implementing the Vision with Clarity, Synergy, and Consistency dictated to invest in our costumers.

The second reason was the clear perception of how difficult is to forecast what can happen in a complex, potentially conflictual relationship with a social body, with several risks involved, such as possibly protests, litigation, obstruction and alienation from the people. The potential time loss and trouble to deal with such issues would have impacted on the mission. The awareness of the environment, its trends and vectors, including some minor unfriendly or diffident constituencies, and its complex behavior, dictated to sweep across the environment with a flow of positive communication. That "system of inputs" leveraged the "statistical approach" to trigger positive hypercycles and their networking, in support of the Wing's mission.

It is exactly what happened. Let's apply the CAL loop to our example, in a very synthetic manner.

Understanding ETV

Knowing the social, political, economic and cultural picture of the regional and local environment, and how it fits in the broader picture of the nation is a fundamental step. Appreciating who's who, what's going on, who likes you and who doesn't and why are only some of the questions that need an answer. To do so, using external and internal "sensors" of different kind is important: friendly constituencies, institutional actors, your own people, and specialized assets. Nevertheless, to really understand your environment and perceive its trends and vectors is necessary to participate to it. Thus, you can sense directly and interactively, and communicate at the same time. Engaging and keeping very open to listening and understanding;

taking every opportunity to communicate, help enormously in building the Big Picture necessary to "Understanding ETV", and useful social capital.

Invent the Future, Channel the Counterpart

In our case, the first step to "invent the future" is to create the means to influence it: again, communication becomes the key element. Creating form and content of our communication exchange with the environment is instrumental in achieving effects. Promoting aggressively an understanding of the Wing that can appeal the "costumer", proposing a positive image of it, participating actively to community's and region's life, caring about informing the media and allowing them to participate to the wing's life, were some of the fundamentals of that communication. All together in a "system of inputs" which includes also many other and also minor ones, these actions could, and did, actually shape the external environment's attitudes toward the Wing. Not everybody could "be shaped", because of actual conflicting interests, or strong prejudice. In those cases, the attempt was to at least channel the counterpart to attitudes of least regret, like ignoring, not confronting from part of radical groups or interests groups. A forthcoming attitude even toward those constituencies could reduce hostility and the very favorable public opinion toward the Wing helped greatly to discourage overt attacks.

Many of such activities are low-cost and require more sensitivity to the issue than significant resources. All possible cost-effective engagement was pursued to "invent a future" of great support from the local community. That support paid back many, many times the investment, besides being the right thing to do. During prolonged operations on the Balkans entailing late night flying, no complaints arose. When demonstrators came from other regions to protest those operations, local affiliates managed to reduce intensity and duration of the protest. When the Wing had a serious unanticipated and prolonged shortage of military doctors, civilian

physicians from the local hospital volunteered for H24 duty for over one year, with no pay. These are only some of the returns. A big one was motivational and pursued on purpose, highlighting the quality of the Wing's personnel to the external audience: the good image of the Wing in the community contributed to make its people proud to be part of it.

Identify Threats and Opportunities

In complex systems, regardless of the quality of the control parameters you use and how hard you work at "inventing the future", there is always a good chance of an emerging threat, or of unexpected opportunities. Sensing those in time for an intervention is critical. To do so in our example, it is necessary to set all sensors to a high perceptiveness mode, nurturing again a high communication flow with the internal and external environment. Active local area connections, both inside and outside the organization, and a strong open door policy for anybody, are among the tools for enhancing perceptiveness. Always engaging assumed hostile/uncertain/unfamiliar actors is another important way to assess, and sometimes defuse, risks. On practical terms, never refuse a contact: in the worst case, you will know what it is about; in the best case, you may defuse a risk or create an opportunity. Engage whoever is trying to reach you for whatever reason, evaluating its relevance against your Mission, Vision and Strategy, every time it is possible. An example of is the direct personal processing by the Commander of any telephone calls or other input for noise or other complaints, including a follow up answer, explaining that "to serve the Country" means to serve its citizens. Another example is the enthusiastic support given by the Wing to the Archeological Superintendent when, during some major works some 2500 years old tombs were found in the perimeter of the fuel depot. Those findings could have easily blocked the work; but using immediately the media to highlight the cooperation between the Wing and the Superintendence, the all-out support given to it right away and the good

reputation of the Wing turned a challenge into the opportunity to further promoting the Wing's interests.

Prioritize Challenges and Answers

Prioritize challenges and the answers we devise for them is actually decision making. Even though it has been routinely utilized in example we are considering, it has a general relevance, beyond any single case. The divergent, perceptive striving to understand and sense must be swiftly brought to converge on decisions at the right time, to be able to seize fleeting opportunities and timely defuse risks. Understanding when to switch between the divergent and the convergent thinking phase is a critical leadership skill. If you converge too soon, you may cut relevant information for the decision. If you converge too late, you may miss the opportunity window and fail completely. Cycling several times between divergent and convergent thinking is often necessary, and proceeding for successive approximations may be a good technique to take the necessary decisions on time and conduct further analysis for follow on actions. Prioritizing therefore requires converging on the most relevant issues, singling them out from the context, and deciding. In assigning priorities, after looking at all the challenges and at all the answers we can define, we need to consider the resources needed for the different solutions, with all identified options and costs. Communication opportunities and needs should always be in the equation, because of their strategic nature and their "statistical influence" value. Low priority/low cost initiatives are to be considered favorably in complexity again because of their possible "non-linear" influencing potential: in a system of inputs, they contribute to shape outcomes because of the synergy and possible positive effects. Once considered all the significant elements and assigned priorities, it is very important to recheck those priorities often, since in VUCA*R* environments things change very rapidly, and mistakes are frequent.

Implementing and Communicating

Implementing the decision is leading people to do things. We discussed the principles to do that effectively. For our example, it is important to note that everything you do is a message. We have seen how the Wing's Vision was: "…, to serve the Country". This Vision was communicated to the external world every possible time, with facts and words: when an unfamiliar and possibly diffident constituency, a network of theater artists, was forced to ask some logistic support to the Wing for a region-wide children's festival, they got much more than that. Rather than a generator and some transportation, they got also an old plane for the kids to paint on in the city square, and wing-sponsored stands, were volunteers would build flying model planes with the children. The cost for the Wing was limited, the return huge all over the local community. Again, implementing is communicating, and it does influence all other phases.

Reassess and readjust

While implementing our public relation campaign, it is critical to monitor the feed-back for actions through "sensors", assessing media coverage, evaluating the support and participation to the Wing's initiatives, and any other source of useful information. If anything goes in the wrong direction, a swift, open response is generally the best course of action. Taking responsibility and acting to fix problems is usually the best approach. If you cannot fix them, explaining well why, and showing care is an effective behavior.

Finally, a couple of closing remarks. Even if the loop is divided in phases, each of them contributes more or less directly to all the other ones. Reality is one and whole. But we have seen in our example how you can consider the *CAL Loop* as a tool, a methodology applicable to any kind of situation. It is sequential to be useful in practice. It will have to be refined through use.

Yet, we think it really helps, and we'll see it in a broader context, when discussing organizations, later on.

PART TWO

LEADERSHIP AND ORGANIZATIONS

Chapter Four

Nature, Nurture and Collective Action

We have seen the implications of our biological heritage on both human collective action and its fundamental enabler: leadership. We have then explored how complexity theories can help defining an approach such to reduce the gap between our "narrow mind" and the increasing complexity of our world. We have also proposed a Comprehending-Acting-Leading model to support leadership in complex environments.

Now, we would like to explore further the relation between human nature and culture in our collective action mechanisms. Examining the interaction of relevant cultural drivers with our deepest self can provide a significant tool for leaders, since it is likely to influence performance in a powerful way. A thorough answer about this interaction would require a huge research work, well beyond the possibilities of this study. Still, proceeding from the anthropological framework we established, from accepted principles about performance of organizations and exhaustive studies on related matters, attempting a credible hypothesis with operational applications is possible.

To investigate the cause-effect relationships between nature, nurture and the effectiveness of the collective action, the discussion considers a class of factors we will name "determinant" ones, with a direct, immediate and generalized effect on behaviors, and one of "influencing" factors, with significant effects on them. To the first class we attribute social needs related to leadership we have seen, coming from our evolutionary roots and residents in our species' genes, determining our average behavioral base trends. To the second, we attribute the cultural factors, strongly influencing individual and collective behaviors. The assumption is that determinant and

influent factors interact and overlay, mutually reinforcing in some cases and combining in other, with a breadth of orientations and nuances as ample as it is variable in terms of social behaviors. The determinant, inherited trends, can be countered and their effect very much reduced by influencing factors, learned in compelling cultures, but not without unbalances and sufferance. Whenever they align and integrate in a synergistic fashion, a much better performance takes place. To support our assumption, we will refer to a synthetic examination of some historical circumstances directly showing a fascinating link between our biological trends and the cultural ones. Through this examination, we strive to define an effective conceptual tool for leaders and people in general: a general map of how to steer cultural trends to support effectiveness of the collective action, shaping its fundamental elements: leadership, culture, processes and structure.

It is generally accepted that history has a strong influence on social systems, and recent research on economic history has defined "dependency from the historical path" the lasting differences in performance of different societies, even when institutions, resources, prices and individual preferences are similar. In presence of structural analogies and common historical roots, results diverge depending upon successive history.[95] To make our point, we'll briefly refer to the Italian case, because of two very distinct levels of effectiveness to compare in the North and in the South, and especially because of 20 years of extensive research led by Harvard Professor Robert D. Putnam,[96] great source of documented evidence. Our first short conceptual discussion starts with the fall of the Roman Empire.

From the Roman to the Soviet Empire…in Five Pages

In the complexity of the Italian history following the fall of the Roman Empire, some trends can be identified as relevant for our thesis. Wherever the relationship between governing elites and governed people, the political and economic conditions and the historic framework

have caused emergence of "decentralized" and entrepreneurial economic forces, favoring individual responsibility and horizontal relations in the social body, the efficiency and prosperity of economies and of social organization and the effectiveness of the military grew.

This thesis has been conceived reading history through the discussed anthropological framework, and has found very strong support from Putnam's research. After having studied for about 20 years the performance of Italian regional institutions Putnam searches the roots of the very different outcomes between the regions in the center-north and those in the south of Italy. His fascinating discussion links very well to the inferences drawn from our anthropological framework. His trip leads him back to the Middle Age Italy, where the most advanced structures of the Christian world were born[97]. In 1100 A.D. two political regimes surprisingly different were established, both very innovative and bearing far reaching consequences: in the south, a strong Norman monarchy, very advanced in the administrative, economic, cultural and artistic fields; in the north, the communes, city-states born as collective mutual defense associations, with an extraordinary level of popular participation to public life[98]. Both were born out of the need for protection from the Middle Age's endemic violence and anarchism. Both were very effective, but also deeply different. At the end of the Twelfth century, Sicily was the richest, better organized and most advanced European state. But in the south, socio-political structures were strongly autocratic. Barons were maintaining their feudal rights and power base, and nobody could dare challenge the will of the great emperor Frederick II. Trends toward autonomy were quelled and the economic life was strictly regulated from above. After the death of the emperor, barons gained more power and cities were in a state of deep subjugation. Latifundia (large plantation real estates) were property of few noblemen, while workers barely survived off the part of the crops the landowners would allow them to keep. For the successive seven

centuries this vertical social and economic structure did not change significantly, notwithstanding the Spanish and French occupation. Any horizontal ties among the people were repressed as subversive.[99]

For our purposes, we need to highlight how the social, political and economic structure was in the south vertical and autocratic, down to the very bottom of the society, preventing empowerment of decentralized social forces that elsewhere found much better opportunities. Historians describe the Frederick's kingdom as "feudal," "bureaucratic" and "absolutist." We will see how these considerations connect to our work. Meanwhile, let's see how things were in the other innovative political system of the Middle Age: the Italian communes defined "an oasis in a forest of feudalism"[100]. They were not democratic in the modern sense, because elites exercised the actual power. But the existence of a strong middle-high class, the level of popular participation to the public life and the number and the huge relevance of associations of citizens were truly extraordinary for that age. Lane (1966) describes how "from the Twelfth to the Sixteenth century, the element that distinguished the [center-north] Italian society from the ones of other European regions has been the intensity of the participation of population to define, largely through persuasion, laws and rules defining its existence"[101]. So, the decentralization of power, of responsibility and of economic initiative was extraordinary in the communes and opposed to the autocratic centralization of the south.

In the center-north of Italy a lively economy, institutions, culture and social life were driven by a horizontal participation to public life. In the south a monarchy strong enough to control both nobility and people would shape social relations in autocratic and vertical patterns, assigning to the barons a control over the social body that strangled any widespread economic

fervor and created the culture of patronage rather than of associations that has characterized the Italian south.

Unfortunately, Italy's political fragmentation and divisiveness made it immediately a weak military adversary for the newly formed European national monarchies of the 15th Century, especially France and Spain. European dynastic wars were fought on Italian soil for centuries, devastating northern Italy together with the terrible plague epidemics of the 16th Century. Half of the population of northern Italian cities died, as their institutions, and basically the whole country reverted to a late version of feudalism, refocused on a plantation economy, with its disempowering and impoverishing consequences. Vertical relationships and patronage emerged in the North and the grip of a new fatalism took hold of the once proud citizens of the communes. Still, elites and peasants somehow maintained their civic traditions and some sense of social responsibility, through various habits, like supporting charitable and public institutions, and maintaining in the countryside old habits of mutual assistance. This heritage carried across the centuries until the tide of the economic development changed, and the take off of northern Italy's economy and institutional effectiveness. In the south, better off in the critical years for wealth and populace, the absence of any such culture and the autocratic and vertical social relations maintained instead a fundamental mistrust in any form of collective action and institution. Successive leaderships reinforced rather than break that mistrust, opening the way to economic underdevelopment and institutional failures, of which the Mafia has been a sadly well known symbol.

Prof. Putnam's research shows accurately, through both qualitative and quantitative analysis, how the different cultures in the north and in the south carry on until today, showing a definite persistence across centuries, notwithstanding the influence of successive historical events.

Overlaying the major underpinnings of the two divergent socio-cultural systems with a table of our determining factors for the effectiveness of the collective action we find some interesting connections. To recap these genetically transmitted Determining Factors for the effectiveness of collective action of evolutionary nature, areas follow: (1) People need group interaction, interpersonal relationship and team participation. (2) People need leadership to ensure group effectiveness, justice and fairness in the group, to process information and elaborate perspectives and to catalyze decisions. (3) People need a close and collaborative relationship with leaders. And lastly, (4) people need purpose and acceptance in the group.

Our historic northern Medieval Italy case shows an intense association life and a strong "horizontal" cooperation and participation in the social life. Hierarchies are flatter, with leaders close to the people; intent to promote a sense of justice and fairness in the social body, are common in the period. Those drivers produce a culture of trust, a thriving decentralized economic and social life and extraordinary results, still influencing the effectiveness of the collective action in Italy today.

On the other hand, where the historical path leads to an autocratic centralization of power, of wealth and of the economy, to the absence of horizontal ties and of a culture of social cooperation and to the domination of remote and rapacious leaders, the influencing factors deny our nature and the effectiveness of the collective action plummets, together with that one of leadership. Other cases come to mind, where more centralized, and disempowering power structures and economies have under performed in comparison with decentralized, more diffused, horizontal systems. The U.S. South, though sharing the same cultural roots with the northern states, developed a plantation economy rather than an industrial one. The basically vertical production structure -- largely based on a few wealthy ones with huge estates, slavery

and a mass of very minor economic activities -- didn't compare to the thriving decentralized, entrepreneurial initiatives in the North, leading eventually to a much more powerful and resilient economic and productive system (with an interesting resemblance to the Italian case). The case of the Soviet Union, where the most powerful centralized, vertical, disempowering system par excellence just imploded because of ineffectiveness of the collective action, seems to confirm the thesis in a striking manner.

Culture and the Social Animal

Our discussion may seem obvious and limited at the same time: of course, good leadership and institutions give good results. We wouldn't worry about them otherwise! In addition, many other factors have not been discussed. Well, it is not obvious at all: the consequences we can draw from it give us important concepts. And limited it is, it needs further research; but the concepts drawn are still valid. Let's see why.

The first observation is that the cases mentioned actually support the thesis in a very strong manner, and the one studied by Putnam does so in a very well documented manner. We can state that when the Influencing Factors align themselves with the Determinant Factors, when social, organizational and institutional cultures fulfill our ancestral social needs, we perform much better. Looking at history from our evolutionary psychology perspective shows an extraordinary coherence across the social behaviors related to our hunter's past, the cultural paths taken by our social systems and their outcomes with regard to the effectiveness of the collective action and the general convergence of leadership theories toward the need of a cooperative, empowering, team-based leadership.[102] It is not an issue of quality of leaders since, as history and experience tell us: great leaders have often created systems that didn't survive them too long. Frederick II was one of the most outstanding monarchs of all times, for intelligence, culture,

organizational, administrative and political skills. He simply didn't understand the power of decentralization and of empowering his citizens, to release the huge potential of their collective talent and motivation; of allowing and exploiting their need for institutions, associations, for collective action with individual and group rewards. The republican communes in the center-north of Italy did, and the effects of that divergence can still be seen today. Lenin and, with different connotations, also Stalin were extraordinary leaders, capable of leading their people to extraordinary accomplishments. But because of their political doctrine they were unable to understand the very same thing. They and their successors created the epitome of a centralized system, and the premises of its collapse. In the end, you cannot ignore the social animal in ourselves and run a complex system for a long time. It will break down.

Our second observation is that diverse cultural imprints relevant for the effectiveness of the collective action overlay across time, with a reinforcing or weakening effect, depending how much they align with the discussed inborn social trends and the preceding cultural ones. This is evident if we consider fairly homogeneous starting situations and successive divergences. In the Italian example, the strong common Roman cultural background was overlaid by a largely common Middle Age, until the discussed divergence took place. Italy was then, both in the south and in the north, leading in Europe for wealth and effectiveness, even if in a very different way. But the extraordinary take-off of the Italian Renaissance in the center-north anticipates the long term effects of that divergence, opening the gap, notwithstanding a relatively wealthy south.[103]

While Italy diverged, another divergence was taking place. The Protestant Reform divided Europe, and the entire Italy was obviously in the opposing field, missing its implications on the effectiveness of the collective action. The decline of the north caused the loss of the decentralized and cooperative social and economic structures and left a heritage of lower

effectiveness even in the north, compared to the golden age of the communes, notwithstanding the persistence of some civic traditions. All these factors, further overlaid by the late reunification and a slow industrialization, opened a deep rift between Italy and the other great European countries, closed only with the economic boom of the second half of the 20th century, and not entirely.

So, historical trends seem to confirm regularly our assumption: the nature of the Social Animal in us must be very well taken into account by our leadership. The culture we promote in our organizations, the processes we establish and the structures we devise need a cooperative, decentralized, empowering leadership, and a fair and informing one.

Thus, the emerging lesson for our purpose from our "history class" is a strong confirmation that leadership is critical to establish a social body's culture. There should therefore be concepts and methods at the organizational level that improve leaderships' chances for success: a practical tool – the *Confronting Complexity Proactively and Systematically (C2PS) Model* is provided. This model, explored in the next chapter, promotes the organization's culture, processes, structure and, first and foremost, leadership, to deal successfully and effectively with VUCA*R* environment. So, back to the future, to the 21st century, let's see how it works.

Chapter Five

Confronting Complexity Proactively and Systematically - The C2PS Model

"Putting transformation on the back burner and focusing solely on the fight at hand is simply

not an option. We are fighting a war unlike any we have fought before – it demands

new ways of thinking about military force, new processes to improve strategic agility,

and new technologies to take the fight to the enemy."

Former Chairman, Joint Chiefs of Staff, General Richard Myers[104]

The CAL Loop, proposed in our previous discussion, focuses mainly on the individual, on the leader. It is a personal and practical tool that improves the leader's own "system," pushing him to be a broad thinker, proactive and Mission and Vision focused. However, looking at the organization level, leadership and *The CAL Loop* in particular, are a significant part but only a part of the whole. Therefore, in this part, we integrate *The CAL Loop* in a larger, holistic system: an overarching model at the organizational level – *The C2PS Model (Confronting Complexity Proactively and Systematically).*The model is a conceptual tool that shapes the whole organization to confront complexity and uncertainty in a systematic, agile manner, informed by *The CAL Loop* vision-focused and proactive decision making. *The C2PS Model* includes *The CAL Loop* as an individual "system" that generates orienting leadership and makes the whole organization perform. Moreover, *The C2PS Model* applies to the whole organization, from the strategic to the tactical level, and one of its exclusive features is that it can be utilized for general guidance in any other context in which collective action is at work (e.g. family, school, society etc.), provided some caveats.

The model has two main goals, the first one, is clearly to make the organization more agile and more relevant in identifying challenges and then reacting accordingly and adequately. The second goal of the model is to consistently invite leaders at all levels of the organization to adopt an agile and proactive way of thinking (i.e. *The CAL Loop*) as their second nature, to "Think CAL." Arguably, there is a direct correlation between the depth and the quality that *The CAL Loop* is implemented in an organization to its success in a VUCA**R** environment, leaders are the center of gravity of the organization, and therefore, a long term goal to enhance leaders' skills is mostly important.

Our discussion and introduction of *The C2PS Model* remains at the conceptual level -- opening a window on this overarching and holistic approach and inviting further exploration. It focuses on *The C2PS Model* as an integrator of concepts and ideas that can improve organization's agility; ideas, concepts and characteristics are presented, leaving to the abundant literature the "how to do it" explanations. A general clarification of *The C2PS Model* is provided, followed by an explanation of the "Think CAL" concept that links between the strategic levels to lower leadership levels in the organization. Then, a zoom-in outlook on the relationship between all the components of the model is proposed; a matrix that underlines the needed links, emphasis and relationships between the main components of the model, including *The CAL Loop*, is provided. The introduction of *The C2PS Model* ends with a focused attention on the importance of leadership as the main enabler and the main attractor at the organization's level.

So, How Does the C2PS Model Work?

"The bend in the road is not the end of the road unless you refuse to take the turn."- Anonymous

The C2PS Model has two integrated fundamental components, tightly linked, so that their interaction provides the holistic effect required. The first important component is *The CAL Loop*

as a recommended way of thinking and acting, the second component is the four organization's main elements (Leadership, Culture, Processes and Structure), that distinguish any organization. The links and relationships between *The CAL Loop* on the one side, and the leadership style, the organization culture, the routine processes and the solid structure of the organization on the other side, are all together the "heart and soul" of the model (the links and relationships are provided in a matrix, later). Figure 6 illustrates in a graphical concept *The C2PS Model* [105]; this graphic representation shows an interacting system, which exhibits a complex, adaptive, resilient behavior; error resistant, focused on the goals but continuously readjusting its course to achieve them.

Figure 6: The C2PS model

THE C2PS MODEL

The Thinking Acting Mechanism

ETV

New Threats / Opportunities

Irregular Events

Initiative Side

The CAL Loop

Mission & Vision

Reactive Side

The 5 Step Guideline

The Goals:
1. Adequate & Relevant Strategy
2. Adaptive & Agile Organization

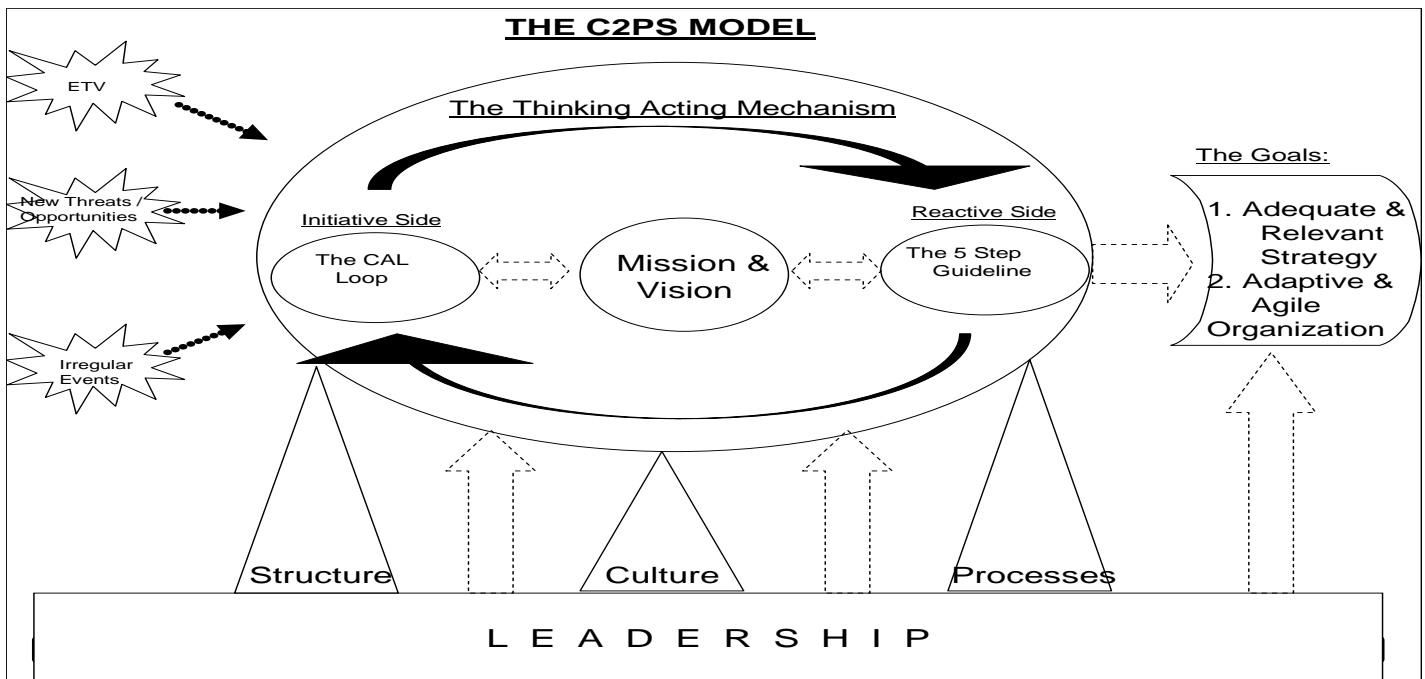Structure   Culture   Processes

L E A D E R S H I P

Figure 6 expresses a true complex system, of which leadership is the <u>attractors force</u>, through the relations it creates in the system; Mission and Vision are the <u>attractor point</u>, so that

the whole model acquires an overarching order. The graphic, therefore, shows how external factors such as ETV (Environment, Trends and Vectors), irregular events and new threats and opportunities, are assessed by the individuals in the organization (through *The CAL Loop*) and influence the organization as a whole, always through the lens of the organization's Mission and Vision. The leadership generates all, and the outcome is both updated strategy and agile organization. Thus, the figure is only a snapshot of a continuously repeated cycle, in which vectors, trends, threats, opportunities and irregular events occur in a chaotic order and the relevant organization has to sense them, to assess their outcome and to update its strategy and in some cases even to update the organization components (i.e. leadership style, culture, process and structure).

Any organization is the combination of the four main elements (leadership, culture, processes and structure) described in the model. These elements characterize organizations. Therefore, transforming organizations means transforming and shaping some or all of these main elements, sometimes simultaneously. In the literature, the main elements of the organization are classified differently[106]; nevertheless and for the purpose of our discussion, the four elements proposed in this work include all the major organization components. Let's define these four elements:

Leadership: We have examined this significant component thoroughly in our previous discussion; however to sum up our definition of leadership we believe that this is the enabler and the attractor of any group activity; a good leadership provides vision and attracts the group members to believe in the vision and to work hard to accomplish it. For our discussion, we adopt the definition of leadership as "the ability to lead, including inspiring others in a shared vision. Leaders have clear visions and they communicate these visions to their employees. They foster

an environment within their companies that encourages risk taking, recognition and rewards, and empowerment allowing other leaders to emerge"[107] with the addition of Drucker - "the lifting of people's vision to a higher sight, the raising of their performance to a higher standard, the building of their personality beyond its normal limitations' (Drucker, 1985)[108].

Culture: Culture, in our understanding is a significant "soft" element in any organization; it includes the cognitive and emotional understanding of the world and the reality shared by a social body, driven by beliefs, values, traditions and so on. The fact that culture is a "soft" and often blurred element provides in the literature some definitions to it; for the purpose of our discussion we simply identify culture as the "personality" of the organization[109].

Process: The organization procedures, activities, routines, meetings and formal interactions that contribute the organization to achieve its Mission and Vision, are, in our definition the processes of an organization. The way each subsystem and subgroup in the organization does things along with other subsystems and subgroups, to achieve the overall goals of the organization, often considered as the processes, and are defined by plans, policies and procedures[110]. We believe that transforming organizations into agile ones has to be focused on the process systems of an organization.

Structure: The definition given in Peters and Waterman's 7S model for *structure* as the "Salient features of organizational chart and interconnections within the organization,"[111] is, for our discussion, a satisfactory one; however, we found that in many cases the major focus of organization who wish to become more agile is to transform and change the structure of the organization. We intentionally provide the structure as the last of the four main elements, mainly because our belief that it is the least important of the four to deal with when transforming

organization: it is, or it should be rather a consequence of the other adjustment. On the other hand, this is not always possible.

The interactions of the four elements with the CAL loop, provided later in a matrix, enhance an organization's ability to achieve its main goals. The first main goal is to have an adequate, updated and relevant strategy that is the outcome of the assessment of the external influences with the organization Mission and Vision. The second, long lasting goal is to have an agile organization; this goal can be achieved by a continuous shaping of the organization four main elements as well as by promoting the "Think CAL" concept, as "second nature" of organization's leaders.

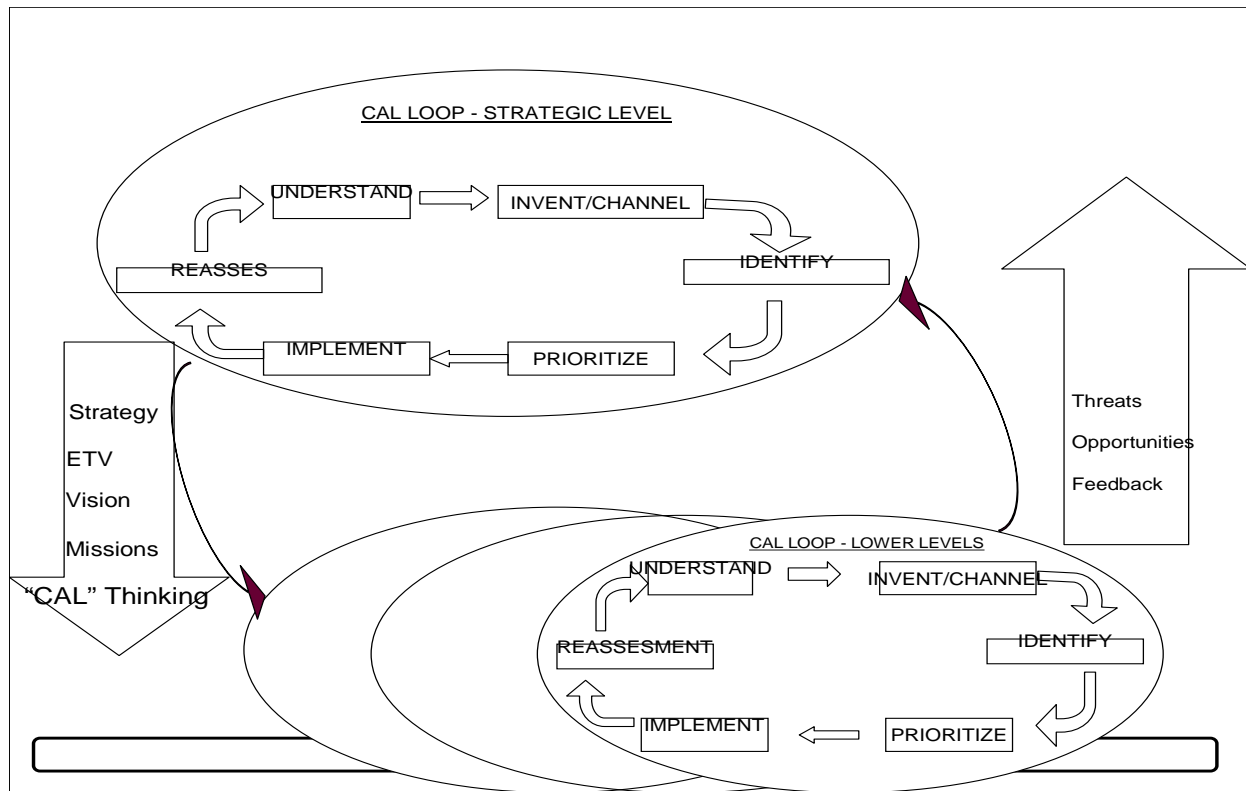## "Think CAL" as a Leading Concept in Agile Organizations

Imagine. Imagine how adaptive and agile an organization becomes if all its leaders in all organization's levels adopt *The CAL Loop* as their conceptual individual methodology to confront complexity and uncertainty. Imagine an organization that all its leaders, from the "big boss" to those who lead just a few workers or soldiers on the "production floor", understand the Mission and Vision of the organization and the environment trends and vectors (ETV). They all push to act proactively, to identify decisively new threats and challenges, in other word, they all adopt the concepts that *The CAL Loop* provides. We believe that the more leaders "think CAL," the more relevant an organization becomes, and therefore, this should be part of any organization toolbox.

An important concept of *The C2PS Model* is to promote decisively the adoption of *The CAL Loop* at the organization level. Moreover, adopting a generic and common way-of–thinking-and-acting in the organization can benefit in other domains of the organization as well, such as the communication and the education domains. For example, if *The CAL Loop* becomes

known and well rooted then it becomes a "common language" in one's organization. The effectiveness of the communication in the organization becomes much better when "vectors," "trends," "irregular events," "Mission and Vision focused" are extensively used, all have the same definitions and understood by many in the organization; furthermore, *The CAL Loop* can be the "leadership generator" that generates other *CAL* loops down to the lowest level of the organization leadership. This is a fundamental relation to build the "team of teams" previously discussed. It pushes strategic leaders to provide leadership guidance to the lower echelons in a decentralized fashion, and to orient all units with the leadership directions. In a long-term perspective, the education domain has even a more significant influence on the organization relevance. An important effort of the strategic leaders should be to mentor leaders in all level of the organization to "think CAL." Notably, this concept does not mean duplicating thought and shaping minds, *The CAL Loop* educates leaders how to think and not what to think.

Figure 7 illustrates the emphasis of the relationship in an organization that adopts the CAL loop in all levels.

Figure 7: The Strategic- tactical relationship in the C2PS model

The outcome of a decisive effort to "think CAL," could be a powerful, synergetic and unified organization; *The C2PS Model* can bring a long term positive effect on an organization; by pushing to adopt *The CAL Loop* early, the strategic thinking seeds are sowed, and a common language in organization is established through all levels. *The CAL Loop* is an individual tool, however, it is our strong belief that the more leaders in all levels of the organization think and act in "CAL" manner (i.e. Comprehend the broad picture and the mission, Act in a proactive manner and Lead in all level of the organization), the better the organization becomes.

A Matrix: Shaping the Organization

The CAL Loop offers six different phases; some are divergent-oriented other are convergent-oriented; the conjunction of each of these phases with each of the four elements of

the organization brings different emphasis to any intersection. As an example, clearly, the leadership emphasis should be different in different phases of *the CAL loop*; leaders should encourage other to bring their own ideas to the table when forecasting trend, vectors, threats and possible answers, but when implementing decisions, leaders should assign timelines and responsibilities, and they ought to be clear and precise.

Figure 8 summarizes our understandings of the unique characteristics of each phase of *The CAL Loop* that should be emphasized within *The C2PS Model*. Based on logical reasoning and leadership experience, the matrix provides some leading concepts in any given phase. In many ways, the matrix provided is a telegraphic but deep-thought summary of many of the ideas and the understandings, captured before in our research on leadership, organizations and complexity.

Figure 8: The matrix

Mission - Vision Strategy Focus	Leadership	culture	processes	structure
In general	* Be vision and mission focused * Focus on strategic issues, study their root causes *Seek out other perspectives, Capitalize on diversity. *Seed and Seize opportunities, mitigate risks * Centralize policy, de-centralize responsibilities, * Lead, mentor and educate	* Feeling of ownership * Happy team * "Little head" vs. "Big Head" * Believe in teamwork * Creative Discipline skills	*Timely arranged to the rapid changes of VUCA*R* environment	*Mission and Vision focused *Team of teams *Lean and mean * De-layered structure * Formal and informal sensors
Understand environment, trends and vectors.	* Divergent thinking prevalent * Broader mind * Strategic thinking skills * Perceptiveness & listening * "Wide-angle camera"	*Cherish Diversity * Value intellectual challenge * Value open discussion & Dialectic discourse * Complexity awareness	*Routine brain-storming phase * Network minds *Empowerment of people *Top down clear vision *Bottom up contribution *Team based processes	* Decentralized * De-layered *Multi-sensor organization *Multidisciplinary integration
Invent the future, **Channel** the counterpart	*Proactive approach *Divergent and creative thinking *Adopt the "statistical approach" *"Red" (Enemy) thinking	* Team thinking * Creativeness as a leading value * Proactive and initiating culture * Think "CAL"	* System of inputs: mitigating risks and seeding opportunities processes *Routine mechanism both in the active and the reactive mode *Think "CAL"	*Red Team component * "Skunk Works"-like Team
Identify new threats and opportunities	* Perceptiveness to weak Signals * "Slightly paranoid" attitude * High-resolution, zoom-in capability	* Cherish bottom-up inputs * Share information * Attention to details	* Frequent, routine re-evaluation; * Aggressive, focused analysis and assessment; * Network information	* Many independent and integrated sensors: * Holistic Intelligence; * High info flow, highly networked
Prioritize Challenges and Answers	*Mission, Vision & Strategy referenced *ETV awareness *Nurture decision-making skills *Analyze Challenges and Answers *Assign priorities	* Result focused * Complexity awareness *Out-of–the-box solutions * Divergent: Openness, challenging, beliefs	* Team, networked analysis * Divergent to convergent thinking switch: timely!	
Implement and **Communicate**	*Clear and precise responsibilities and timeline *prioritizing, resources oriented *Communicate	*Disciplined *Goal oriented *Ownership and strive to win.	*Close relations. *Outcomes driven. *Smooth Interagency Interface.	*Capability based; *Project teams. *Smooth Interagency Interface.
Reassess	*Find problems not guilt. *Strong motivation to follow up lessons learned. *Leading by example	*Frank learning ambitions.	*Learning organization *Transforming lessons learned to implications.	

This matrix provides concepts, but invites further exploration. Needless to say that the most important pillar that can make the difference is our main refrain throughout all our work – it is leadership! Let's explore this phenomenon just a little bit more.

Leadership, Organizations and the C2PS Model

"Two important working tools should be in a leader's pocket – a virtual compass and

an invisible magnet. A compass heading on the vision and a magnet for attracting people on the

compass' heading" – Yakov

"However, be aware of the influence of the magnet on your compass" – Nando

The last, but certainly not least, concept we focus on in *The C2PS Model* is the unique and significant role of leadership. This unique element is, in our point of view, the "force" that, at all levels, creates order out of non-linear human processes, orienting them toward the goal of the organization and influencing the relationships among all functions, "attracting" processes in a coherent whole. Leadership achieves that through the principles identified in the "social animal" and the "narrow mind" discussions (cooperative leadership, empowering of people, decentralization, critical thinking, information processing, etc.). Identifying and implementing the Mission and the Vision of the organization (with Clarity, Consistency and Synergy) fulfills those principles, and becomes a powerful attractor point for the whole system. Only leadership drives to organization transformation, which begins with leadership transformation. Leadership, especially relevant leadership under uncertainty and in complex environments, cannot be implemented by "to do" and "not to do" lists of behaviors: it is an art. However, even an artist needs some training, and has to learn and to improve his skills. In our joint work we realize that there are some fundamental observations on leadership and organizations that can make the

difference between success and failure. So, with all the needed caution, we decide to end our work with some observations on relevant leadership.

Always be vision and mission focused

In the children's fantasy *Alice in Wonderland*, Alice came to a junction in the road and asked the Cheshire cat for advice: "Cheshire-Puss -- would you tell me please, which way I ought to go from here?", "That depends a good deal on where you want to get to," said the Cat. "I don't much care where," said Alice, and the cat reply was "Then it doesn't matter which way you go…"[112] The cat's advice is applicable to little Alice, but more than that, it is applicable to great leaders. The need to have a clear vision, a distinct direction might be obvious to some, however, exploring and sharing the vision and the missions of the organization is a challenge for any leader. The ability to attract the organization's members to the vision is significantly important for the organization success, but at the same time it requires a great deal of effort from the leader. We believe that even if a leader does not see the results immediately, this effort is worthwhile. A leader should clarify and communicate the vision and missions of the organization – the ambitious goal should be that the junior workers at the lower echelon of the organization understand their duty as an important part of something big, i.e. of accomplishing the organization's vision. Communicating the vision and the directions of the organization clearly is not a one time event; it is a never-ending journey. A useful tool to promote the vision is to *Relate and Emphasize* the daily actions, decisions and routine processes of the organization to the vision and mission. The more the subordinates understand the vision of the organization and the more they understand their contribution for achieving this vision, the more likely the organization is relevant and successful.

Focus on strategic issues, study their root causes

 "Strategic leaders must be able to withhold response long enough to confirm they are dealing with the core issues. This may require a great deal of self-confidence."[113] Maybe the best way to know if a leader deals with strategic issues is to "jump to the future" and retrospectively look at the current issue. If, with these retrospective lens, the issue looks relevant and influences the future then clearly it is a strategic one, and if not, it might be an urgent issue but not an important and surely not a strategic one. However, not only focusing on strategic issues is important, but also understanding the reasons that make issues strategic ones is significantly important. Finding the root causes enables a leader to find the problem and not to deal with the symptoms. A smart friend once told me "Ask at least three times *why*, this might get you to the roots," so try to deeply investigate why things happens, it might get you to the core issue and not just to the obvious symptoms.

Believe in teamwork, Seek out other perspectives, Capitalize on diversity

 The *TEAM* Rule is "**T**ogether **E**veryone **A**chieves **M**ore [if there is a] **T**otal **E**ffort of **A**ll **M**embers."[114] VUCA***R*** environment requires a great effort of teamwork, and the need for a diversity of thoughts is crucial to the success of an organization in complexity. Lee Iacocca[115] once said that if his deputies would think like him they would be useless. Diversity is needed in order to stay relevant and promote critical thinking especially when divergent analysis is needed. Nevertheless, even when teaming up and having a productive teamwork, leadership is necessary. Leading a productive teamwork is a challenging task, and emotional and cognitive skills are required in order to achieve a productive "happy team". Clearly, even a happy and productive team needs good leadership. With the understanding that "the speed of the boss is the speed of

the team,[116]" leaders should focus teams to strategic issues and should continuously challenge the team's members.

Seed and Seize opportunities, mitigate risks

We have argued before that reality is more complex than ever before, too often it is impossible to find the cause-result relations. Therefore, a broad and risk-mitigating approach is needed. A decisive effort of a leader to find in any event, action, threat, challenge and even difficulty, the hidden opportunity should be adopted. This is not just an optimistic approach, it is a pragmatic one based on the understanding that in VUCA*R* environments the principle that "if it does not help us, let's not make it a potential harm," is the right approach to use. While directed by the vision and missions of the organization, ask yourself if there is a hidden opportunity for your organization; if so seizes it, and if not then either seed a potential opportunity or, in worse cases, mitigate potential risks.

Centralize policy, de-centralize responsibilities, and delayer organization's structure

*P*romoting a sense of ownership among subordinates is a major key for success. Motivated subordinates that understand the organization's goals and its vision can make the difference. But on the other hand, organizations, specifically non-profit ones as militaries have a built-in tendency to grow, to expand and often to add more echelons; it is almost the unwritten destiny of non-profit organization to become more bureaucratic and "heavy". The thorough discussion we previously had on the importance of communication, especially bottom-up communication on the organization's agility emphasizes the constant struggle for having a "lean and mean" organization. Agile organizations are ones in which bottom-up information can be transferred quickly and in useful timeframe, to the decision-making process; motivated people, healthy culture and delayered structure are the solid ground for relevant organizations.

Adopt the proactive approach, act and let others react

Leadership is action, not position;[117] this understanding is many times over reinforced in complex environment. One of the main themes of this work is to adopt the proactive approach. Decisive effort to shape the future, to invent, to initiate, and even when reacting, to be proactive are our main observations for successful leadership in VUCA***R*** environment. Statistically, initiative approach mitigates risks and moreover, this approach outmaneuvers the counterpart to react – and the good news is that the VUCA***R*** environment applies to the counterpart as well…

Being "slightly paranoid" is a healthy prescription for long lasting success

Success is followed by another success; your organization is on the right track! You thank your people for making the organization so successful, it seems as the sky is the limit for your organization; what a feeling – your organization is undefeatable!!! Especially in moments like these, you, as the leader should be slightly paranoid; in order to gain more success, you should not be dazzled by the success. Complacency is a trap of successful organizations, of successful and skilled leaders therefore, a slight paranoia is a positive disturbance. Seek for threats and dangers and take precautionary measures, even if winds of success are blowing.

Improve Creative Discipline skills

The fighter pilot's creative blunder often happens when pilots ignore the basics, when they trust their creative skills, way too much; the way to professionalism and positive creativeness begins with acquiring the ability to be very good in reality checks! To improvise one must know the basics well -- we call this unique capability -- the "creative discipline" skill. Leaders should be well balanced and at the same time self aware, a clear understanding whether it is the time to be innovative or the time to be "by the book" should be manifested and communicated. For example, the CAL loop offers six main phases; some of the phases (basically

the divergent ones) acquire creativeness and innovative thinking while others (mainly the convergent ones) require more discipline, timelines and clear responsibilities. A leader should identify what should be emphasized and moreover should try to improve both creativeness and discipline skills; time and experience shows us that these two are not conflicting skills, on the contrary, these two, if used with balance and awareness, can enhance synergy.

Create formal and informal sensors

Are you often surprised of things and events that happen in your organization? If so, this advice might assist you as a leader. There is no substitute for accurate knowledge - Know yourself, know your business, and know your men.[118] Learn your people and from them learn on the organization and its culture; however, don't count only on formal sensors and on the information they provide; the formal sensors are essential but not sufficient, therefore, be slightly paranoid (remember?) seek for informal knowledge and especially seek for informal sensors in the organization. Our experiences showed us that the information those informal sensors can provide are sometimes extremely valuable and could not be achieved by any other mean. It takes time and a lot of efforts to establish these, but it is very often worth it.

And finally,

Lead, mentor and educate your subordinates

"He who cares for days, sows wheat,

He who cares for years, plants trees,

He, who cares for decades, educates people."

- Anonymous

Our final observation is maybe the important one. Leadership is about leading people and not about leading processes, actions nor systems. It might sound a cliché but the most important

asset that organization has, is its human resource; nevertheless, this is by far the most complex resource to take care of. Communicate and talk to people in their own language, and "if you do it well, they'll say, 'God, he said exactly what I was thinking.' And when they begin to respect you, they'll follow you to the death."[119] Lead them, mentor them, challenge them, criticize them, ask for more, but most important – care about them and let them feel you care -- People will forget what you said...People will forget what you did.... But people will NEVER forget how you made them feel.[120] Mentoring leadership is one of a kind, it is both a significant motivator and skills improver of lower echelons; this is the most important enabler that transforms an organization to be a learning one. "You can do the work of two people, but you can't be two people. Instead, you have to inspire the next guy down the line and get him to inspire his people."[121]

Investigating the success and failures of militaries in confronting new threats and complex environment emphasizes to us that there must be a logical technique, a method that shape an organization to be more adaptive than others. In our work, we offered some methods and models that can assist leaders and organizations; however, it is the leadership in each organization that plays a significant role. Leadership is the main attractor and the main enabler of an organization. We have no doubt that the models are essential tools, but they are just tools; much more important than the tools themselves are the ways they are wielded; transforming organizations begins with transforming leadership -- this what makes the difference.

CONCLUSION

"All scientific work is incomplete – whether it be observational or experimental. All scientific work is liable to be upset or modified by advancing knowledge. That does not confer upon us a freedom to ignore the knowledge we already have, or to postpone the action that it appears to demand at a given time." – Sir Austin Bradford, 1897-1991

In our exploration of leadership, we have followed trails leading from ideas we were intrigued by to experiences that marked our personal and professional lives, and from experiences back to ideas. We did explore only a little part of what we felt necessary, and elaborated only a part of what we explored. Still we dared turning some concepts into practical tools, models to assist implementing them into leadership applications. We have come to this trip from different directions, and have taken different travel directions, to find at every step amazing convergences toward a bottom-line: reality is one and whole, and it is a complex one. Its aspects we focused on, leadership and collective action, have been looked at from different frames of references: an anthropological, evolutionary framework; the peculiar lens of the new science of complexity and chaos; an historical framework; and an intense discussion of many practical leadership cases and of their connections to the concepts explored. This multidisciplinary approach we found ourselves in while looking for answers, is a statement in itself, and an integral part of the culture we deem necessary to stay, or become, relevant in our times.

Our discussion of leadership and evolution bears some important observations and implications for the effectiveness of the collective action. The first one is that we are deeply social animals, tailored for small group interaction. We need determined, leadership, and a cooperative one. We need personalized relationships, leaders close to their people, and to feel

part of a team. We are very perceptive of justice and fairness in the organization: together with communication and shared values, these are fundamental issues in making a group into a team. An examination of the social needs and behaviors we inherit from our ancestors coincides in an amazing way with the principles advocated by leadership studies, defined through observational and empirical data.

The second implication is that our brain is made for a much simpler world: the hunting-gathering one of our Paleolithic predecessors. However, our world is today is hugely more complex and rapidly changing than that one in which we evolved. This creates a gap between our inherited narrowly focusing mind and the complexity we have to confront. Pursuing "broadening trends" to upgrade our capability to comprehend and act in complex environments is a foundation of any strategic leadership development. Understanding human behaviors and their roots, the role of ethics and value systems in our social life and their influence on our cognitive abilities, conflict management and the fundamentals of history, are some of the elements of those foundations. Familiarity with meta-cognition, i.e. the ways and limitations of our thinking, and the techniques to enhance our "thinking know-how", are indispensable tools for strategic leaders. Eventually, the specific ability to apply this "broader mind" to shape and leverage the tools that information technologies are making available to us, is a powerful asset to pursue "simplicity on the other side of complexity". We can and should now strive for "wisdom systems", led by knowledge and creativity, assisted by the networked information our technology is creating, for once, with a great potential to integrate rather than stovepipe.

Discussing complexity, intellectual curiosity has led to consider whether the new science of complexity and chaos could contribute to leadership. Again, amazing convergences emerged. Complex systems of any kind, from the economy to living organisms, from communities of ants

to computer models show some similar characteristics: their inputs and output do not show direct relationship, they are hard to predict, highly decentralized and composed of many elements networked by a dense information exchange. This exchange is the critical, governing process of the system, capable to "freeze" it, throwing it into chaos or making it into a self-organizing, adaptive, robust and resilient whole. In human systems, several inferences can be drawn by an examination of those characteristics. Shaping form and content of the communication flow according to the leadership principles we drew from our evolutionary history pushes the organization toward the decentralized, self-organizing and adaptive mode we found the most effective in nature. Communication, in its wider sense, is the key strategic issue.

Another key concept is about intellectual humbleness as a key cognitive resource: paradoxically, the smarter you are the humbler. The extreme difficulty to predict outcomes in complex systems defeats the linear industrial age thinking. Approaching complex problems with a linear logic is a recipe for failure. To influence outcomes, we need to operate on a "statistical basis", choosing a coherent and multidimensional system of inputs, clearly, consistently and synergistically bearing on the goals through the lens of our "mission" and "vision". Our systems of inputs should continuously seek to seed opportunities, while we keep ready to seize them whenever they arise, and operate to mitigate risks. Investing on relationships rather than on elements is another conceptual consequence of this approach: for example, on a network of leaders, rather than on leaders.

From the complexity theories and their fascinating "strange attractors" we note a last, powerful parallelism: leadership appears as an attractor force for a human complex system, just as pressure gradients attract a tornado together, creating its wholeness and its huge power. If the right attractor points for our hearts and minds are chosen, the ones deriving from our deepest

self, our collective action can achieve an extraordinary cohesion and effectiveness, just like our lost band of hunters in their environment. Little is known about the reasons behind the behaviors of complex systems. However, we feel that strategic leadership can strongly benefit from studying their patterns and the possible approaches to influence them. This is the sense of our modest contribution.

The third frame of reference we utilized to look at leadership is the historical one. Again, our short, documented trip through Italian history shows an extraordinary coherence with the concepts emerging from the previous two frameworks. The different outcomes in the effectiveness of the collective action between the North and the South of Italy can be clearly retraced to the different leadership system they were influenced by. The Italian and other historical cases show how wherever culture and behaviors were mainly based on decentralized, horizontal, empowered social and economic relations, and on a fair and informing leadership, collective action is highly effective. On the contrary, a centralized, vertical social and economic structure, with a limited information exchange and a distant leadership, creates rigid, ineffective and losing social systems. So, aligning culture with our nature yields the best results for our collective action, and by far. Interesting enough, our nature is aligned with the working of complex adaptive systems, the decentralized, self-organizing, resilient ones: they demand our culture to be aligned as well.

Throughout our work, a discussion of practical cases was tightly intertwined with our three theoretical frameworks. The fourth frame of reference, experience, would fit nicely with the other ones. Moreover, the concepts emerging from those foundations could be used to define and refine leadership applications. And two applications, conceptual methodologies, are proposed to suggest "how to think" rather than "what to think", in order to succeed in the

VUCAR environment. The first, a tool for leaders, is the *Comprehending-Acting-Leading Loop.* The loop, is driven by the organization Mission, Vision and Strategy, and strives for the "big picture" through the "Understand Environment, Trends and Vectors" phase; it promotes a proactive approach demanding to "Invent the Future"; requires a high perceptiveness to "weak signals" in the "Identify New Threats and Opportunities" phase; asks for a divergent-convergent decision making process in the "Prioritize Threats and Answers" phase; focuses on disciplined execution and simultaneous communication in the "Implement and Communicate" phase; and eventually re-evaluates both actions and decisional process in the "Reassess" phase. The *CAL Loop* has a proactive orientation, and this strongly emphasized concept is provided even when reacting to unexpected events, with a specific model. Eventually, the *CAL Loop* is meant to be taught since the beginning of leaders' education, to prime broad, systematic and creative thinking in our young leaders-to-be, and allow common language and understanding at all leadership levels of the organization. Although the meaning of the word "Cal" in Hebrew is "easy", the loop is not meant to make the decision-making process easier, but more holistic and therefore to increase the probability to reach the best answer.

The second methodology is *The C2PS (Confronting Complexity Proactively and Systematically) Model*. This overarching model uses the *CAL Loop* as its "engine" at all leadership levels to influence and orient a diffused and decentralized system of *CAL Loops* at all the organization' echelons. Through an intense and reciprocal communication flow throughout the organization, *Think CAL* becomes a leading motto and common culture, improving the leadership process itself. The *C2PS Model* also integrates the conceptual foundations we discussed through our frames of reference and throughout our work together with the *CAL Loop*, and brings them to bear on the organization's main elements: Leadership, Culture, Process and

Structure. A synthetic matrix crosses each phase of the *Loop* with each of these elements, remarking some guidelines to shape the organization toward an agile, decentralized, delayered, adaptive and proactive team of teams, tailored for VUCA*R* environments, and above all, ready to morph to anticipate change. A much deeper discussion of those guidelines is warranted, and could follow in a later work. Meanwhile, we like to open a window on how organizational change can be informed by our approach.

Our trip has been most fascinating, for the two authors, and quite a challenging one. It was an extraordinary learning experience, witnessing its own message: think big, capitalize on diversity, be perceptive, seeking out other perspectives; stay flexible, seed opportunities, mitigate risks, and team up, even if it may be harder. It is our strong belief and sincere hope that the observations provided in this work, as well as the practical tools explored, can be useful for leaders, helping us to stay relevant.

Epilogue

"Keep serendipity in mind" - Anonymous

"Life is like a box of chocolates – you never know what you're gonna get", that's what Forrest Gump's mother taught him when he was a little boy. In our box we initially found carpooling, and that led to researching together, connecting two paths with very diverse prologues. Unwrapping some more, we found commonality, synergy, and friendship.

Our joint venture of almost a year comes now to an end. It has been an exciting and challenging journey, for two once strangers driving, discussing and researching together through trails and roots of leadership, complexity and the Washington D.C. traffic... Curiosity, optimism, giving ourselves a clear "Mission and Vision", hard work, and actually many of the very concepts and ideas we have found throughout the work itself, assisted us in overcoming thresholds and making different experiences converge in common perspectives and thoughts. We feel like our work allowed us quick looks, glimpses into "leadership in complexity". For sure, there is much more to be explored, and we are left with an appetite for it. Our journey will go on, somewhat and somehow.

As a closing thought, yes, life is like a box of chocolates, and often much more complex – you never know what you are going to get. Still, it is our strong belief that we can influence the results of our own complex reality, seeding opportunities and mitigating risks. We can proactively improve the chances to get good things out of complexity and the unknown, and thus to have a better future.

Appendix One

Reacting Proactively – The Five step guideline

"Every problem is an opportunity in disguise." - Anonymous

A new promising day has just begun; you are at your office, in an important strategic leadership position. You might be a military commander, a civilian manager or a senior CEO. Full of energy, ideas and enthusiasm, you lean back in your chair, promising yourself that today you won't let the urgent distract you from dealing with the important. Today you will proactively and decisively lead your organization to enhance its goals, vision and mission. But then it happens– a surprising telephone delivers an undesired message. It is the first time you hear about this unpleasant issue: an irregular event has just occurred in the organization, under your responsibility. It is a significant event and everyone expects you to handle the new situation. You are forced to react. Surprisingly, although a lot has been written on leadership, almost all is on the proactive aspects; reacting and responding are integral parts of any leader's experience, yet it is almost impossible to find a comprehensive article that analyzes the reactive side of leadership. This paradox inspired me to develop *The Five Step Guideline*.

How should a leader react to an irregular event? What points of concern should be analyzed before responding? What are the reaction tools? And most important, can a leader transform surprising, unplanned and sometimes unpleasant events into opportunities? The purpose of *The Five Step Guideline* is to provide a holistic approach to the reactive side of leadership. The model is a practical tool, a pragmatic guideline that hopefully will help all leaders, especially strategic ones, to adopt holistic and logical methods when reacting to irregular events. While providing a uniform guideline, the model still enables each leader to react

differently according to his analysis and to seize the hidden opportunities and eventually to promote his vision, values and beliefs. Furthermore, if the model, which provides common definitions and methodical analysis, is routinely used, it can significantly improve the communication between a leader and his subordinates.

The paper first defines the meaning of an "irregular event," then presents the reaction measures that a leader can use. Finally, it provides the model with its five steps: (1) the **final outcomes** of the irregular event, (2) the **process** that caused the event to happen, including individual and leadership responsibilities (3) the **involved individuals' background**, (4) the **organization's record**, history and culture, and finally (5) the **leader's values and vision**.

What should be considered an "Irregular Event?"

A car accident, sexual harassment, a breach of trust, and a brave soldier risking his life and saving others in action--all have something in common: they are all irregular events. An irregular event is a significant event, good or bad, that rarely happens, but when it occurs, causes significant consequences to the organization as a whole or for its members as individuals. It might be irregular in its occurrence, content, or its consequences. In many cases, an irregular event might shake the organization's basic beliefs, principles or values; and consequently, forces the organization to change its planned agenda and be concerned with the event's impact. Moreover, an irregular event might cause an emotional reaction from subordinates (as in the case of severe casualties). The leader's reaction, which is composed of three main parameters, is the expected scenario that often follows an irregular event.

The Reaction is a Sum of Corrective Measures, Their Intensity and Communication Tools

A leader has unlimited possibilities to choose from when he considers his reaction. Arguably, even when the leader decides not to react, he actually reacts and delivers a message to

his organization. To choose a meaningful response, three main questions should be addressed: What kind of **corrective measures** should be used? How **intense** should be the use of the corrective measure? And most important, what are the **messages** that should be emphasized from this irregular event?

Corrective measures: There are four different types of corrective measures; each of them has different implications and different consequences: punishment, education and training, professional fitness measures, and supportive actions. **Punishment** is the practice of imposing something unpleasant on a wrongdoer as a response to something unwanted that the wrongdoer has done.[122] This is the most widely used measure. Nevertheless, in many cases it might be the easiest, but poorest measure, due to limited analysis of the event. **Education and training** mainly enables the individuals involved to shape their skills so they are less likely to repeat the mistake again. Extra training and repeated practicing are examples of the use of this measure. **Professional fitness measure** means discrediting or even disqualifying someone from having the professional approval that he had before, due to loss of credibility. This severe tool should only be used when the leader comes to understand that the subordinate's skills are no longer sufficient to do the job. A **supportive measure** is very important tool for the strategic leader. It should be used when the circumstances of the event require deep encouragement of either the organization or the individuals involved. In these circumstances leaders should offer hope. Moreover, the opportunity to encourage a subordinate is an important tool that the leader has to strengthen both his organization and his leadership. Many times the use of a supportive measure reflects a strategic leader that is blessed with both courage and a human-oriented leadership.

Intensity: This is an important parameter that mainly expresses how significant the leader considers the event and its circumstances. The intensity must be calculated when using any of the

corrective tools previously mentioned. For example, if a punishment is the corrective measure that the leader chose, then a strong reaction, namely severe punishment, is the best way the leader can deliver the message, given the event and the behaviors are extremely unacceptable.
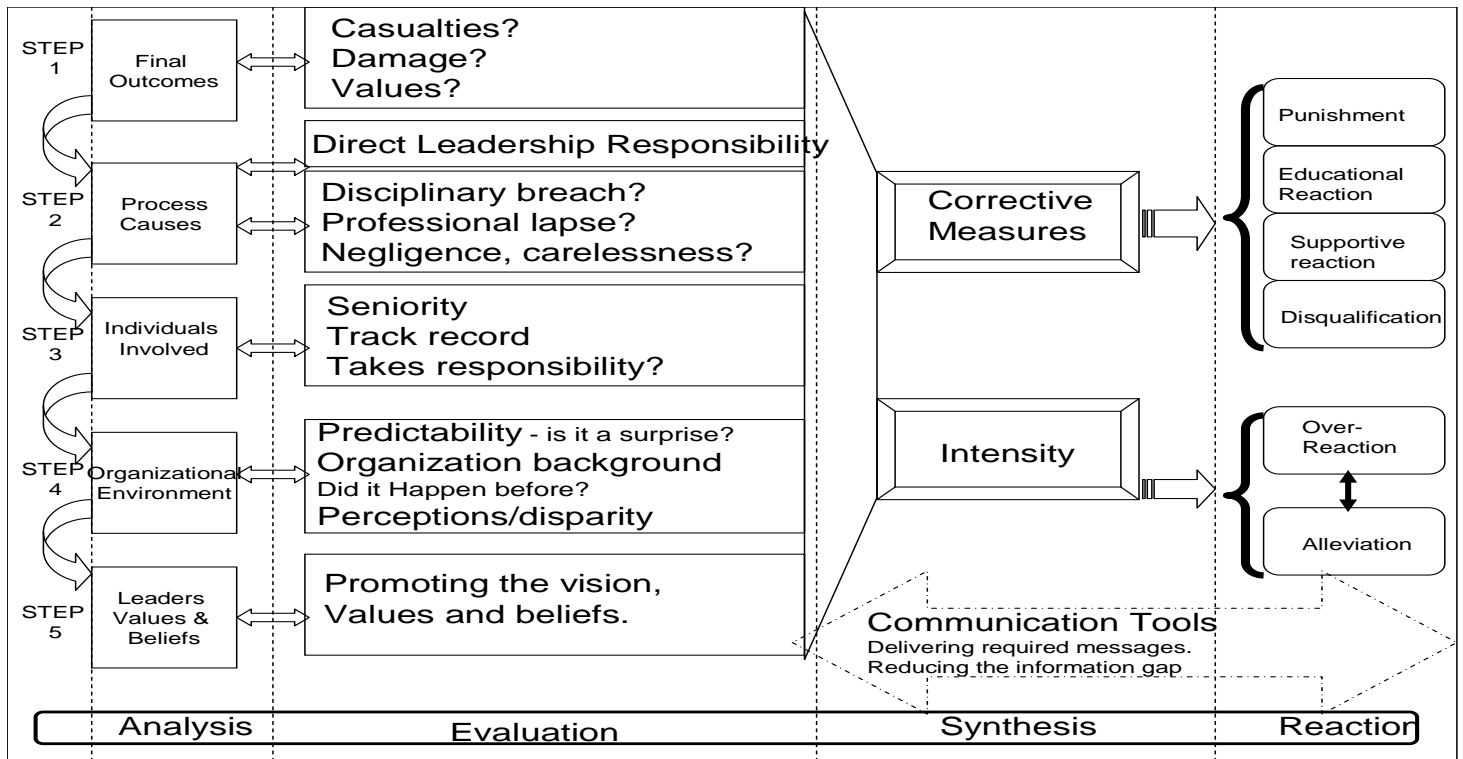
Communication tools: This is maybe the most important part of the strategic leader's reaction. The event already happened. Now you can use it to promote the organization's agenda, values, mission or vision. Communication is more than a key to a leader's credibility;[123] it enables a strategic leader to express his point of view and his beliefs. Many times, even if the right analysis was done and the right messages were chosen, they won't be assimilated in the organization if they are not effectively communicated. Therefore, communicating and sometimes (when the event and/or the reaction are complicated and significant) deliberately over-communicating is the right thing to do. The model, with its classification of the steps and the type of corrective measures, if routinely used, can establish a common language between the leader and his subordinates. Consequently, even if a complicated event entails a complicated reaction, the messages delivered by the leader can be better understood.

The Five Step Guideline: Analyzing and Evaluating an Irregular Event

In order to decide which corrective measures to use and their intensity, the right messages and how they are delivered, the leader needs first to holistically analyze and evaluate the event and its unique circumstances. Figure 9 presents a scheme of *The Five Step Guideline* that, if followed, systematically and logically enables this analysis. The model presents five questions that need to be evaluated so that the broad picture and the complexity of the event can be understood: (1) what are the **final outcomes** of the event? (2) What is the **process** that caused the event? (3) What is the record of **the individuals** that are directly involved? (4) What is the

organizational background and the organization culture related to the event? And finally, (5)

what **leader's values** can be promoted from this event?

Figure 9: A scheme of *The Five Step Guideline*

STEP 1	Final Outcomes	Casualties? Damage? Values?		
STEP 2	Process Causes	Direct Leadership Responsibility / Disciplinary breach? Professional lapse? Negligence, carelessness?	Corrective Measures	Punishment / Educational Reaction / Supportive reaction / Disqualification
STEP 3	Individuals Involved	Seniority Track record Takes responsibility?		
STEP 4	Organizational Environment	Predictability - is it a surprise? Organization background Did it Happen before? Perceptions/disparity	Intensity	Over-Reaction / Alleviation
STEP 5	Leaders Values & Beliefs	Promoting the vision, Values and beliefs.	Communication Tools Delivering required messages. Reducing the information gap	
Analysis		Evaluation	Synthesis	Reaction

Steps 1 & 2: The Final Outcomes and the Process

"Find the problem, not the guilt" - Japanese quote

The most important factor that will guide the reaction is the final outcome of the event.

The final outcomes should be evaluated at three levels: casualties and fatalities, material

damage and the third, violation of values. Evaluating the extent of casualties and material

damage is relatively easy and clear; however, analyzing violation of values is usually blurrier.

Thus, a leader has to underline the core values of his organization and thereby analyze violations

or breaches of these values. For example, events like breach of trust, fraud, betrayal and even

attempts to do forbidden actions can be considered as irregular events although no material damage or casualty is reported. The final outcomes mainly affect how intense will the reaction be.

The process that leads to the event is the second important issue to analyze. It has two main parts, the first is the individuals' direct contribution to the event and the second is the leadership contribution to the event (will be discussed next). Both parts should be well analyzed in order to achieve a deep understanding of the event, particularly its causes, problems, and its responsibilities. The process analysis will directly affect what corrective measures to use. The individuals' contribution can be typed with three classifications: A **disciplinary violation**, a **professional mistake**, or fault that happened from **negligence or carelessness**. A disciplinary violation is one that happened due to deliberately breaking the rules or the law. A professional mistake is one that mainly expresses the understanding that this kind of error is not expected from someone with that level of experience or skills. However, while many irregular events come from negligence or carelessness, defining them as such is much more complicated. Therefore, the recommended way to evaluate the causes is by using elimination, meaning: Was it a deliberate mistake? If not, then it is not a disciplinary issue. Was the mistake expected from a person with that level of experience? If not, then this is not a professional mistake; therefore the cause of the event is negligence. Events that happened because someone did not notice, did not pay enough attention or did not prioritize his action correctly are usually events that can be typed as ones that are caused from carelessness.

There is a direct link between the causes of the event to the corrective measures used. An event that happened due to misconduct should lead to punishment. If a professional mistake is the cause, then further education and training is needed (unless the professional mistake is

routinely recurring, then it might lead to disqualifying or discrediting of professional fitness). Nevertheless, an event caused by carelessness entails ambiguity and complexity; therefore the leader may use all kinds of corrective measures.

Direct and Indirect Leadership responsibility

The second domain of the process is the leadership's contribution. This is a wide, complex, and grey issue. Arguably, everything, including irregular events, is in someway leadership responsibility. The leader is responsible for manning, educating, training and many other issues that impact anything in the organization; therefore, in every event, success or failure, the leader and the leadership have responsibility even if indirectly. Nevertheless, while there is indirect leadership responsibility in the occurring of any irregular event, it is most important to analyze the leadership direct contribution and direct responsibility to the event. For purposes of this discussion, the *direct leadership responsibility* needs to be clarified as part of the analysis of the process. A few questions can guide us when clarifying the extent of the *direct leadership responsibility.* First, did the event happen in someway due to leadership decision? If so, did the leader's decision or action contribute directly to the occurrence of the event? If so, how significantly did it contribute to the event? And last, did leaders at all levels act as they should? In many cases the answers to these questions clarify the *direct leadership responsibility*. But, in some cases the answers are not clear cut. Nevertheless, a strategic leader must analyze *direct leadership responsibility* as part of the process' analysis. Although it might be the most complicated and delicate part to analyze, it focuses the leader to find not only the blame, but also the problems and it might even dramatically affects his reaction.

Steps 3, 4, and 5: The individuals, the organization and the messages

The last three steps in the model complete the leader's broad understanding of the event. The third step analyzes the *involved individuals*-- their record, their position and rank, their background, the way they understand the event and take responsibility. They are all crucial to evaluate how to react. A good leader needs to ask those involved many questions in order to realize how they define and understand the event within its broad context. The fourth step is to analyze the *organizational background*. A strategic leader should promote general messages from this single event; therefore analysis is important. Define the contribution of the organization's culture and norms. As a role of thumb view how surprising the irregular event is. If it was not a great surprise, then, most likely, the organizational culture directly contributes to the occurrence of the event. Finally, the fifth step before reacting is to look at your internal compass as a strategic leader. Remind yourself what *the vision and the core beliefs and values* of your organization should be and promote some of them when you react! Paradoxically, reaction is a very good opportunity to promote values; if it is generally considered an authentic act, and therefore can be an effective tool.

Transforming Unplanned Response to Vision Focused Reaction – It Can Be Done

"Develop and communicate strong beliefs" - Rudolph Giuliani[124]

Leaders reactions should be and can be vision oriented. The ability to analyze and understand an irregular event and to use it to promote values and beliefs is one of the main skills that elevate a leader to the level of a strategic one. *The Five Step Guideline* provides a holistic approach to the reactive side of strategic leadership; with its five steps, the model provides a systematic analysis that enables a strategic leader to use the appropriate corrective measures at the required intensity. Moreover, the model entails a decisive attempt to communicate and

deliver the appropriate vision-oriented messages. It is unmistakably clear that this is a capability

that a strategic leader should obtain and develop.

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Footnotes

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[1] *Strategic Leadership: The Competitive Edge*, Jacobs, T.O., Unpublished paper ICAF – NDU, 2005 pp. 11

[2] The distinction between humans and hominids is not universally agreed upon. Many anthropologists classify as hominids all human-like species before Homo Sapiens(circa 100,000 years ago). Richard Leakey defines as hominids the species prior to Homo Erectus (circa 2,000,000 years ago).

[3] *The Naked Ape; a Zoologist Study of the Human Anima,* Desmond Morris, New York, McGraw Hill, 1967, pp. 147.

[4] Joseph C. Rost, "Leadership Development in the New Millennium," The Journal of Leadership Studies, Vol.1, No.1, 1993.

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[6] For a brief, interesting overview of the issue and of the epistemology of social sciences, see Bernard H. Russell*, Research Methods in Anthropology; Qualitative and Quantitative Approaches*, (USA, Altamira Press, 1995), pp. 1-18.

[7] A prudent discussion of sociobiology can be found in Joseph B. Birdsell, *Human Evolution: an Introduction to the New Physical Anthropology*, (Boston: Houghton Mifflin, 1981). For a more update debate look, among others, on the site www.psych.nwu.edu/~sengupta/sociobio.html

[8] Walter F. Bodmer, *The Book of Man: the Humane Genome Project and the Quest to Discover our Genetic Heritage* (New York: Scribner, 1995). The human genome mapping was completed in 2000, and interpretation is still in its initial stages.

[9] Richard E. Leakey, *The Origin of Humankind*, (New York: BasicBooks, 1994), xiii-xv, pp. 8-9.

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[11] Konrad Lorenz, *King Salomon Ring; New Light on Animal Ways*, (New York: Crowell, 1952), 119.

[12] Samuel A. Stouffer et al., *The American Soldier. Vol.2, Combat and its Aftermath*, (Manhattan, Kan.: Military Affairs/Aerospace Historian), 1977, 85, 96, 118-119, 130-149, 169, 179-185, 348-349, 382-383

[13] Desmond Morris, *The Naked Ape,* 1967, New York: Delta Books, pp. 175

[14] Desmond Morris, *Manwatching: a Field Guide to Human Behavior,* (New York: H. N. Abrams, 1977), pp. 159.

[15] Desmond Morris, *The Naked Ape,* 1967, New York: Delta Books, p.1.

[16] Joseph C. Rost, "Leadership Development in the New Millennium," *The Journal of Leadership Studies*, Vol.1, No.1, 1993, 99.

[17] Gen. Krulak's speech at the Air University, Maxwell AFB, September 1998. Quoted with permission.

[18] Bill Creech, *The Five Pillars of TQM*, (New York: Truman Talley books/Dutton, 1994), see index for teams, teamwork.

[19] Ibid., 78.

[20] Lean Six Sigma is a methodology based on lean manufacturing processes coupled with a decentralized, team-based, bottom-up working relationships.

[21] For a brief discussion of early "Homo" social life see Leakey, *The Origin of Humankind*, pp. 59-61.

[22] Novelli Jr. L., Kirkmann B. L., Shapiro D.L., *Effective Implementation of Organizational Change: An Organizational Justice Perspective*. In: Cooper C.L. e Rosseau D.M. (eds.), *Trends in Organizational Behavior*, vol.2, (Chicester: John Wiley & Sons), pp.15-36.

[23] Creech, pp. 294-397, particularly pp. 380-385.

[24] The following discussion is excepted from *Strategic Leadership and The Narrow Mind: What We Don't Do Well and Why,* Giancotti F., 2001, AU 24 *Concepts for Air Force Leadership*, Air University, Maxwell AFB AL.

[25] For a clear, updated discussion of our origins see Leakey, *The Origin of Humankind.*

[26] Birdsell, *Human Evolution: an Introduction to the New Physical Anthropology.*

[27] Further discussion on the unchanged characteristics of modern humans from at least about 40,000 years ago can be found in Morris, op. cit., Birdsell, op. cit., Leakey, op. cit.

[28] For some reference on cognitive behaviors, see concepts, emotions, inferences, long term memory, short term memory, problem solving, reasoning and other terms in Michael W. Eysenck, *The Blackwell Dictionary of Cognitive Psychology*, (Oxford, UK, Basil Blackwell 1990) [1 book, many authors]. Other good references are the comparative study on cognitive processes of Joan Markessini, *Strategic Leadership in a Changing World Order: Requisite Cognitive Skills*, Research Product, (CAE-Link Allen-Army Research Institute for the Behavioral and

Social Sciences, 1990) and Elliott Jacques & Stephen D. Clement, *Executive Leadership: A Practical Guide To Managing Complexity*, (Cambridge, MA, 1991-1994) [1 book, 2 authors].

[29] This last one is a definition of problem solving. It is interesting to note how five major models for human cognitive processes are basically identical to the proposed scheme which, by the way, was well known since the Greek philosophic thought. See Markessini, table 10, pp. 57-59.

[30] Eysenck, Michael W., *The Blackwell Dictionary of Cognitive Psychology*, Oxford, UK, Basil, Blackwell, 1990. pp. 131.

[31] For references on future and complexity see John L. Petersen, *"The Road to 2015,* (Corte Madera, CA: Waite Group Press, 1994)

[32] 2025, White Papers, Vol.1, Air University, Maxwell AFB, AL, 1996, Lt Gen Jay W. Kelley, *Brilliant Warrior,* 239.

[33] Joseph C. Rost, "Leadership Development in the New Millennium,"," *The Journal of Leadership Studies*, Vol.1, No.1, 1993, 99.

[34] Myers and Briggs Type Indicator, Executive Assessment & Development Program and Kirton Adaption-Innovation Inventory testing are regularly performed in Department of Defense educational institutions.

[35] John A. Warden III, Airpower Journal, Spring 1995, pp.41-55. Air University Press, 1995.

[36] An interesting insight about the influence of personality on the way people think comes from the Myers Briggs Type Indicator. See Bill Knowlton, Mike McGee, "Strategic Leadership and Personality: Making the MBTI Relevant,"," from *The MBTI and Strategic Leadership*, National Defense University, Industrial College of the Armed Forces, Washington D.C., 1994.

[37] A good discussion of the prevalent American cultural perspective is in Air University, International Officer School Handbook, 1998, 3-2, 3-9.

[38] George B. Forsythe, "The Preparation of Strategic Leaders,"," Parameters, Vol.22, No.1, Spring 1992, pp. 38-49. Published 1992 by the US Army War College.

[39] Markessini, table 10, pp. 57-59.

[40] This was a refrain, almost a class motto, during the Flight Safety Course, Accident Investigation Classes, Norton A.F.B., CA ,1989.

[41] For a fascinating discussion of some of these consequences, see Friedman, "*The World is Flat: a Brief History of the Twenty-First Century*", Farrar, Straus & Giroux, New York, 2005.

[42] A good introduction to Network-Centric Warfare is found in John J. Garstka, David S. Alberts, Frederick P. Stain, "N*etwok Centric Warfare: Developing and Leveraging Information Superiority"*. Command Control Research Program, Office of the Assistant Secretary of Defense, Washington DC, 1999.

[43] Richard I. Lester and John C. Kunich, "Leadership and Management: the Quality Quadrants, Leadership in the 21st Century elective course, handout issued for IP2 readings, Air University, 1999.

[44] Recent studies on the cognitive abilities of the human mind have spawned a great number of different taxonomies. The mentioned comparative research from Markessini shows 20 models, plus Markessini's own. Generally, there is no conflict between the diverse interpretations of human cognitive process and the proposed evolutionary scheme.

[45] See The Drucker Foundation, *Leader of the future,* (S. Francisco, Jossey Bass Publishers, 1996). Frederick S. Ciaccio, *Leadership for the 21st Century*, *Armed Forces Controller*, Spring 1996, 14-16; Maj. Roderick R. Magee II, Building *Strategic Leadership for the 21st Century*, Military Review, February 1993, 36-44; Mark D. Youngblood, *Leadership at the Edge of Chaos Strategy & Leadership*, September/October 1997, 9-14;Szafranski, Richard. "When Waves Collide: Future Conflict." JFQ: Joint Force Quarterly, 7:77-84 Spring '95.

[46] For information about the state of research about these disciplines, see Leakey, *The Origin of Humankind* and Bodmer, *The Book of Man: the Humane Genome Project and the Quest to Discover our Genetic Heritage.*

[47] Leda Cosmides, John Tooby, *Evolutionary Psychology: a Primer*, Center for Evolutionary Psychology, (University of California, Santa Barbara, 1997).

[48] Ronald G. Greenwood, "Leadership Theory: a Historical Look at its Evolution,"," *The Journal of Leadership Studies*, Vol.1, No.1, 1993.

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[50] Irving H. Buchen, *Servant leadership: A Model for Future Faculty and Future Institutions*,The Journal of Leadership Studies, Vol.5, No.1, 1998, 125-134; C. William Pollard, "The Leader Who Serves,"," from The Drucker foundation, *Leader of the future*, 241-248, (S. Francisco, Jossey Bass Publishers, 1996).

[51] Robert S. Kaplan and David P. Norton, *The Strategy-Focused Organization: How Balanced Scorecard Companies Thrive in the New Business Environment* , 2000, Harvard bussiness school press.

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[53] Markessini, Joan, *Strategic Leadership in a Changing World Order: Requisite Cognitive Skills*, Research Product, CAE-Link Allen-Army Research Institute for the Behavioral and Social Sciences, 1990.

[54] Max DePree, *Leadership is an Art*, 22, (New York, Dell Trade Paperback, 1989).

[55] Sanders. T. Irene, *Harnessing Complexity: Organizational Implications of a Scientific Frontier.* Simon & Schuster, 1998., p.57; and Gandolfi, Alberto, *Formicai,Imperi, Cervelli,* Bollati Boringheiri, 1999, p. 69.

[56] The "Butterfly Effect" is often ascribed to Lorenz. In a paper in 1963 given to the New York Academy of sciences, he states: One meteorologist remarked that if the theory were correct, one flap of a seagull's wings would be enough to alter the course of the weather forever. By the time of his talk at the December 1972 meeting of the American Association for the Advancement of Science in Washington, D.C. the seagull had evolved into the more poetic butterfly - the title of his talk was[*] : Predictability: Does the Flap of a Butterfly's Wings in Brazil set off a Tornado in Texas? In the applet we also see a second incarnation of the Butterfly - the amazing geometric structure discovered by Lorenz in his numerical simulations of three very simple equations that now bear his name.* As quoted in "Chaos and Nonlinear Dynamics" by R.C.Hilborn (Oxford Uni-versity Press, 1994). This information was kindly sent by Corrie Modell.Last modified Tuesday, February 27, 2001. Michael Cross.http://www.its.caltech.edu/~mcc/chaos_new/Lorenz.html. On this site you can also experiment with Lorenz equations varying the initial conditions and determining various, yet similar, attractors.

[57] On this site you can also experiment with Lorenz equations varying the initial conditions and determining various, yet similar, attractors see .http://www.its.caltech.edu/~mcc/chaos_new/Lorenz.html of Michael Cross.

[58] Gandolfi, 1999; Sanders 1998; Merry, 1995; Axelrod, Cohen, 1999; and Gleick, 1987.

[59] Sanders. T. Irene, Harnessing Complexity: Organizational Implications of a Scientific Frontier. Simon & Schuster, 1998.

[60] Gandolfi (1999) p.19

[61] Gandolfi, 1999, pp. 76-78

[62] Grove, Andrew S., *Only the Paranoid Survive - How to Exploit the Crisis Points That Challenge Every Company,* Intel Cooperation, 1999

[63] Gladwell, Malcolm, *The Tipping Point,* Little Brown, 2000.

[64] Laszlo a. Evoluzione, Feltrinelli, Millano, 1986, p.13.

[65] James Gleick (1987)

[66] Laszlo, 1986, p. 103

[67] Bak P. and Chen K., *La critica autorganizzata,* Marzo 1991.

[68] Prigogine I and Stengers I., *Order out of Chaos,* Bantam Books, New York, 1984. p. 188

[69] Merry, Uri, *Coping with Uncertainty,* Praeger, Westport, CT, 1995

[70] Gandolfi, pp.65-66.

[71] Bar-Yam Yaneer, *Making things work – solving complex problems in a complex world,* 2004.

[72] Berlin, Isaiah, *The sense of reality*, Studies in Ideas and their History., p.4

[73] Gandolfi, 1999, p. 90.

[74] From the briefing of NorthCom Commander, General Timothy J. Keating.

[75] On this site you can also experiment with Lorenz equations varying the initial conditions and determining various, yet similar, attractors see .http://www.its.caltech.edu/~mcc/chaos_new/Lorenz.html of Michael Cross.

[76] Even if fractals show many beautiful pictures, they are a just an infinitesimal part of the simplest plotting of non-linear systems.

[77] Examples can be found at Gandolfi, 1999, page 75.

[78] Paul Davis, lectures for the Elective Course "Complexity and Strategic Thinking", Industrial College for the Armed Forces,NDU, Washington, 2006.

[79] Bar-Yam, 2004.

[80] Gandolfi, 1999.

[81] A tactical situation in which many hostile airplanes "merge" and fight in a limited airspace, in such a way that it is extremely difficult to keep track of all of them.

[82] In the year 2000 during a visit to the Army Flight School in Fort Rucker, Alabama

[83] The Collected Works of Abraham Lincoln edited by Roy P. Basler, Volume VII, "Letter to Albert G. Hodges" (April 4, 1864), p. 281.

[84] In his essay, *The essence of winning and loosing*, Col. Boyd describes the OODA LOOP and the importance of a mechanism based on Orientation, Observation, Decision, and Action methodology.

[85] The PDCA model is part of the Six Sigma concept, retrieved from http://www.isixsigma.com/offsite.asp?A=Fr&Url=http://quality.enr.state.nc.us/tools/pdca.htm , April 25, 2006.

[86] A quote of Allan Kay in 1971,inventor of Smalltalk which was the inspiration and technical basis for the MacIntosh and subsequent windowing based systems (NextStep, Microsoft Windows 3.1/95/98/NT, X-Windows, Motif, etc...).

[87] *The Strategy of the Fighter Pilot,* 2002, by Keith H. Hammonds , retrieved from http://www.fastcompany.com/magazine/59/pilot.html , April 26, 2005.

[88] This emphasis is stated by the Israeli Minister of Defense, Shaul Mofaz since he took office in 2000

[89] "What you don't know about making decisions" by Davud A. Garvin and Michael A. Roberto, Harvard Business Review September 2001

[90] *The Five Step guideline*, is a non-published paper of Col. Yakov Shaharabani that offers holistic approach to the reactive side of leadership. The model is presented thoroughly in appendix 1.

[91] T*he vision thing: without it you'll never be a world –class organization*, By Ken Blanchard and Jesse Stoner, Leader to Leader, PP. 21-28

[92] T. Owen Jacobs, *Strategic leadership the competitive edge*

[93] The 5 Step Guideline, is a non-published paper of Col. Yakov Shaharabani, 2005, that offers a holistic approach to the reactive side of leadership. The model is presented thoroughly in appendix 1.

[94] Morris A. Cohen, Professor of operation and information management at the Fishman-Davidson Center for Service and Operation management, during a discussion regarding the reaction towards Hurricane Katrina Retrieved from http://knowledge.wharton.upenn.edu

[95] Douglass C. North, "Institution, Institutional Change and Economic Performance, Cambridge University Press, New York 1990, p.92-104.

[96] Robert D. Putnam, 1993. *Making Democracy Work – Civic Traditions in Modern Italy.* Princeton University Press, Princeton, New Jersey.

[97] Ibidem, 121-124

[98] Ibidem, 124-130.

[99] Professor Putnam's discussion articulates very well the dynamics and the long lasting effects of that evolution, or lack thereof, and we invite to visit his entertaining historical analysis.

[100] Pietr Kropotin, "Manual Aid: A Factor of Evolution,"," Heinemann, London 1902, p.166.

[101] Frederic C. Lane, "Venice and History,"," John Hopkins University Press, Baltimore 1966, cap. 32, "At the Roots of Republicanism,"," p.535.

[102] Sashkin, Marshall and Sashkin, Molly G., Leadership That Matters, The critical factors for making a difference in people's lives and organization's success, San Francisco: Berrett-Koehler, 2003.

[103] Robert D. Putnam, 1993. *Making Democracy Work – Civic Traditions in Modern Italy.* Princeton University Press, Princeton, New Jersey (pagine 157,158)

[104] Quote of General Richard Myers, CJCS, From *Element of defense transformation,* office of force transformation, office of the SECDEF, October 2004.

[105] For the purpose of our discussion, we introduce the C2PS model in figure 6 as a static snapshot, while in reality it is a dynamic routinely mechanism.

[106] For example, the 7S' model (provided by Peters and Waterman 1982) discusses seven components of organization: Strategy, Structure, Systems, Staff, Style, Shared values and Skills. Where the meaning of each component is as followed:

     Strategy : Plan or course of action leading to allocation of resources to reach identified goals.
     Structure: Salient features of organizational chart and interconnections within the organization.
     Systems: procedures and routine processes, including how information moves around the organization.
     Staff: personnel categories within the organization, e.g. academics, administration, technicians.

Style: characteristics of how key managers behave in order to achieve the org's goals.

Shared Values: the significant meaning or guiding principle and concepts that the org. imbues in its members.

Skills: distinctive capabilities of key personnel and the org. as a whole.

However, when analyzing these components the four elements provided in this work include them all.

[107] Retrieved from strategis.ic.gc.ca/epic/internet/instco-levc.nsf/en/h_qw00037e.html, April 2, 2006.

[108] Retrieved from wps.prenhall.com/wps/media/objects/213/218150/glossary.htm, April 2, 2006.

[109] The idea of "personality" is taken from http://www.managementhelp.org/fp_progs/np_mod/orgs_crs.htm , April 2, 2006.

[110] Retrieved from http://www.managementhelp.org/org_thry/org_defn.htm , April 2, 2006.

[111] The 7S' model, Peters and Waterman, 1982.

[112] *Alice in Wonderland*, Lewis Carroll, 1951

[113] *The competitive edge,* T. Owen Jacobs, Strategic leadership

[114] Anonymous

[115] Lee Iacocca was the chairman and CEO of Chrysler Corp. published in 1984 (co-authored with William Novak) the book, *Iacocca: An Autobiography.*

[116] The quote is referred to Lee Iacocca

[117] The quote is referred to Donald H. McGannon.

[118] The quote is referred to Lee Iacocca

[119] The quote is referred to Lee Iacocca

[120] Anonymous

[121] The quote is referred to Lee Iacocca

[122] Retrieved from http://www.answers.com/topic/punishment by January 20, 2006.

[123] *Leaders and Communication: Four Deadly Sins*, by Jill Geisler, Retrieved from http://www.poynter.org/dg.lts/id.34/aid.2597/column.htm by January 20, 2006.

[124] *Leadership*, by Rudolph Giuliani, former major of New York city, retrieved from the second part chapter 8