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ПЕРЕСМОТР ОБУЧЕНИЯ МЕНЕДЖЕРОВ: ОБУЧЕНИЕ ГОТОВНОСТИ ДЕЙСТВОВАТЬ ПРИ ВНЕЗАПНЫХ ЗАТРУДНЕНИЯХ, ВЫЗВАННЫХ ДИНАМИЧЕСКОЙ СЛОЖНОСТЬЮ УПРАВЛЯЕМОЙ СИСТЕМЫ

RETHINKING EXECUTIVE EDUCATION: A PROGRAM FOR RESPONDING TO SUDDEN DISRUPTIONS CAUSED BY DYNAMIC COMPLEXITY

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This paper contends that current executive education programs are inadequate for the present business environment which is characterized by increasingly dynamic complexity characterized by increasing rate of change, widespread connectivity, globalization, and innovation. We propose a new model which underlies a new education program that focuses on the pathway to anticipate and navigate dynamic complexities, and how to avoid catastrophe by creating new models of business thinking and structure in sync with the "new normal." We describe the assumptions and details of the model for making effective decisions for improved performance in dynamic complexity and present sample contents of the education program.

Key words: executive education, systems thinking, design thinking, complexity, culture, leadership.

INTRODUCTION

This paper contends that executive education programs are inadequate for the present business environment which is characterized by increasingly dynamic complexity characterized by increasing rate of change, widespread connectivity, globalization, and innovation.[1] Sudden disruptions occur despite well-formulatedplanning and without obvious anomalies in key performance indicators. The resultis that leading or managing as usual[2] is no longer effective.

Dynamic complexity describes the situation facing many countries, organizations, programs, projects, and policies. This situation is a product of a new and exceptionally rare combination of unforeseen forces that produce severe turbulence[3] and strategic blindness[4] thereby increasing and exacerbating danger and potential for failure. The significant risk is catastrophic outcome which may result when those in positions of responsibility do not have the ability to recognize what is happening – because cause and effect are subtle and occur in different time and space – and do something effective to make changes. Although catastrophes cannot be predicted, to a large extent they can be anticipated by leaders who possess and wisely apply cognition, experience, appropriate decision making tools, and judgment.

Inadequacy of leadership competency in coping with dynamic complexity is not a function of the atrophying of analytical skills; these remain strong in leaders and executive education programs, and they are essential for many situation contexts. However, what is absent from executive education and other organized management education is the recognition of additional systemic cognitive abilities and social competencies for creating awareness to perceive situations exhibiting complexities, and appropriate strategies for coping with sudden disruptions.

> Nokia lost the smartphone battle despite having half of the global market share in 2007. Some argue that it was down to software, others that it was complacency. We argue that collective emotions within the company were a big part of the story. Leaders who are able to identify and manage patterns of emotions in a collective are better able to make their ambitious strategies a reality. Our argument centres around the idea that the emotions felt by a large number of people within an organisation can determine the success of strategy implementation even when these feelings go unexpressed.
>
> Quy Huy and Timo Vuori, March 13, 2014[5]

Traditional executive education programs that the *people at the helm*, i.e., those in leadership or aspiring leadership roles of organizations, programs, projects, and policies are required to undergo, although considered necessary, are not sufficient to recognize the attributes or early warning signals and circumstances from which complexities emerge. Traditional programs also do not enable development of the distinctive and requisite proficiencies for addressing sudden disruptions.

> The pilot on stricken QF32 has revealed how his jet was just seconds away from disaster after an engine exploded four minutes into take-off. Qantas Captain Richard de Crespigny, who was at the helm of the state-of-the-art jet when the explosion occurred, also reveals how he and his crew managed to land his crippled plane as things went from bad to worse.
>
> News.Com Australia, March 21, 2014[6]

It is becoming increasingly apparent that in today's turbulent environments that challenges cannot be overcome by the application of reductionist thinking or linear approaches or by top-down management styles[7] or even by the use of so called experts from within or outside; yet organizations and governments continue these approaches even in the face of a "perfect storm."* New ways of thinking, organizing, and co-evolving are needed. Above all, what is needed is a new model of learning that develops cognitive capacity to make sound decisions under adverse conditions characterized by dynamic complexity.

> We've had revolution in countries of North Africa; in Yemen, Jordan and Syria suddenly protests have appeared. In Ireland young techno-savvy professionals are agitating for a "Second Republic"; in France the youth from banlieues battled police on the streets to defend the retirement rights of 60-year olds; in Greece striking and rioting have become a national pastime. And in Britain we've had riots and student occupations that changed the political mood ... horizontalism has become endemic because technology makes it easy: it kills vertical hierarchies spontaneously.
>
> Paul Mason (BBC UK), Twenty reasons why it's kicking off everywhere, February 5, 2011[8]

THE PREMISE

A new approach to executive education is surmised based on the following propositions.

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* A "perfect storm" refers to an event where a situation is aggravated drastically by an exceptionally rare combination of circumstances.

Proposition 1: Each state of dynamic complexity is unique and requires unique responses. A standardized checklist, algorithm or preformed set of procedures or processes is inadequate by themselves.

Proposition 2: Proficiency to generate those responses and navigate dynamic complexity is an *art*, an expression of creative competencies and imagination, based on rapid integration and deployment of a portfolio of competences and capacities.

These interact with personality attributes of the leader to reach the valued outcomes of effective decisions for improved performance. Proficiency of making effective decisions for improving performance is an emergent property of these sets (see Figure 1).

This new program should focus on the pathway to anticipate and navigate dynamic complexities, and how to avoid catastrophe by creating new models of business thinking and structure in sync with the "new normal".

Relevant skills refer to cognitive and performance abilities that are domain-general and domain-specific. General skills include collaboration, cooperation and communication; specific skills include use of specific software or technology in response to relevant stimuli or in appropriate environments. These

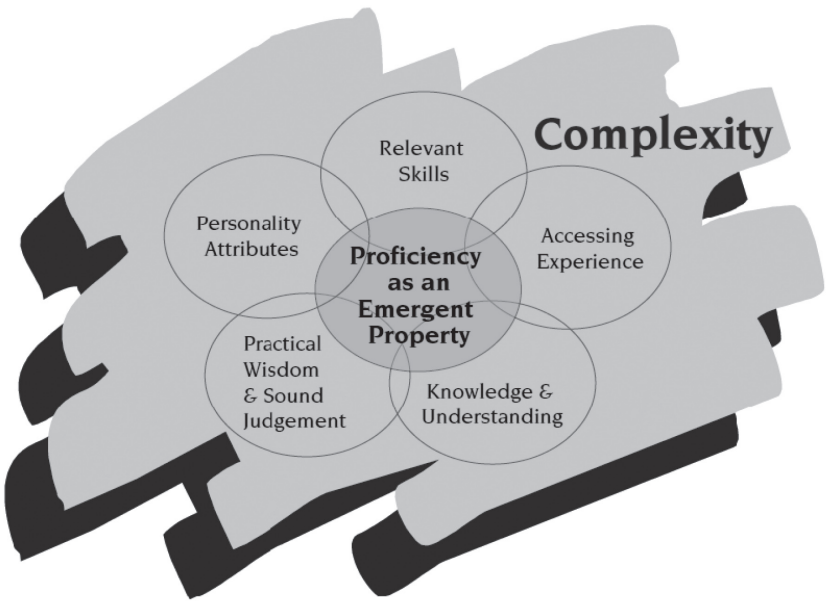

Figure 1. Proficiency to Make Effective Decisions for Improved Performance in Dynamic Complexity

include the ability and willingness to develop new platforms for opportunity beyond the current horizon as well as the diversity of talent and resources necessary to envision that world before those events actually occur.

Accessing experience refers to recalling from memory requisite and relevant past experiences that apply to the current situation but not to be hamstrung by them. Accessing these requires that the decision maker has accumulated over time and in varied circumstances through conceptual/intellectual learning, experimentation/action learning, and reflection/emotional learning a broad set of experiences from which to draw when confronted with sudden dynamic complexity.

Knowledge and understanding of the situation lead to efficiency compared to effectiveness (which is efficiency multiplied by measured value). We propose that the accuracy of perceiving a situation characterized by turbulence is significantly increased when using an appropriate perception model and methodology. Leaders in the Internet Century[9] must be comfortable with its messiness and uncertainties and be able to identify emergent phenomena and the linkage they have or do not have with the current system and business model.

Practical wisdom and sound judgment refer to an intellectual and moral virtue that ensures selection of the right end by the right means – cognitively and behaviorally - across situational contexts. Unlike a state of science but similar to art, it is concerned with both producing outcomes and with the experience of doing the action itself. It includes study of humanities in addition to technology.

Leadership attributes are the individual capacities, competencies, styles, traits and states that are sought and developed *for leadership*. Over the centuries, thousands of philosophers, researchers, practitioners, and writers of military, political, human drama, and more have offered theories and models which in thousands of books, education programs and training workshops purport to improve leadership decision making and performance. For dynamic complexity, few of these are relevant, and none alone is sufficient for the new era of business and the thinking approaches it requires. As Peter Drucker noted[10] the new knowledge worker requires a new cognitive and social tool kit.

THE MODEL BEHIND THE PROGRAM

Based on the above premise, we present a model[i] which underlies the executive education program for making effective decisions for improved performance in dynamic complexity. The model depicts a multi-layered approach to executive education. It displays how the ability to rapidly assimilate, sort through, and comprehend vast amounts of data/information in order to make

[i] © 2014 Systems Wisdom

the right decisions depends on approaches to learning, knowledge of critical concepts particularly systems thinking as a mindset/filter, and knowledge of enabling IT. It constantly asks the participant to recalibrate and adjust to unforeseen circumstances and to corporate assaults on the status quo, as argued by Clayton Christensen.[1]

ARCHITECTURE OF THE MODEL

The architecture is depicted by concentric circles (Figure 2). The outer circle is the approach to learning based on immersive models[11]. The second circle consists of appreciating five relevant and critical concepts: complexity, systems thinking, design thinking, leadership and organizational culture. The third circle concerns the smart integration of the latest enabling information technology in support of decision making. These enclose the metaphoric generative learning[12] funnel which provides a pathway to effective decisions for improved performance.

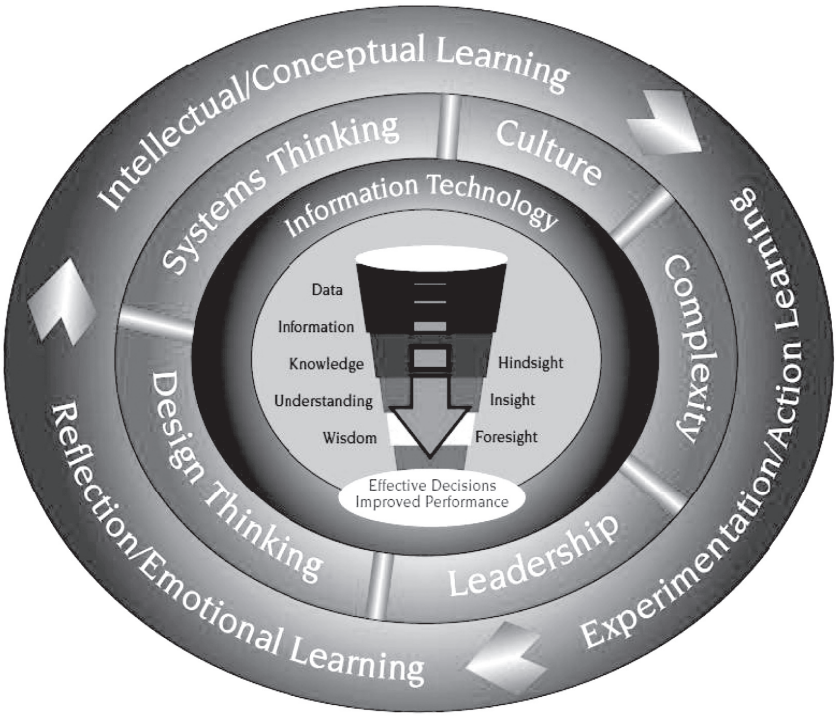

Figure 2. Model for Effective Decisions for Improved Performance

IMMERSIVE LEARNING MODELS

The executive education program is grounded in engaging participants in three immersive learning models. Rather than abstract cases, learning is directed to specific challenges experienced in the respective organizations of the participants.

Conceptual/intellectual learning focuses on the cognitive processing of information, applying types of reasoning approaches, recalling stored images and information, and relating ideas, images, patterns, and structures. It also concentrates on conceptualizing and hypothesizing why situations or events occur and how they work.

Experimentation/action learning concerns how and where new hypotheses and theories are tested. This kind of learning is dynamic, active, involves taking risks, making experimental choices or actions, receiving feedback from others, failing then retesting.

Reflection/emotional learning which is central to the thinking and learning process, pays attention to the emotional content and context of participants' experiences in order to connect these to cognitive and active learning. It allows learners to think through their experiments and consider emotions and meanings (e.g., attitudes, biases, resentments) in addition to incorporating traditionally relevant facts and sanitized results.

APPRECIATION OF RELEVANT AND CRITICAL CONCEPTS

The program presents through discussion, team, and individual exercises, five concepts. Each concept is related directly to specific challenges experienced in the respective organizations of the participants.

Complexity is a special kind of individual or shared cognitive experience in response to a problem or situation where many parts interact with each other in multiple ways and where the relationship between cause and effect can only be discerned in retrospect, but not in advance**.** It is not apparent how or to what extent these activities are interdependent; and the environment to a decision maker appears ill-structured, dynamic, and uncertain.[13] Dynamic complexity emerges when what is experienced in the current reality conflicts with one's previously established cognitive map of expected patterns, structures and outcomes. In such situations, a person may experience an inability to fully recognize, understand, feel control over or do something productive.

Systems thinking is a framework or lens for seeing, inquiring about, and understanding the world.[14] It is an alternative to the predominant scientific and analytic framework where problems can be mechanically simplified and reduced in order to find clarity and to determine prime causes which when repaired or replaced generate solutions. In the *Decision Loom* (pp. 148-149), Barabba7 argues that the framework/lens acts as a predisposing mindset; it af-

fects (facilitates or distorts) for an individual or group how data, information and knowledge are understood as they move through the funnel. When applying a systems thinking or systems view of the world, one is oriented not to divisible or structured disciplines or to powerful or central parts, but to whole, interconnected and socially organized systems. Such systems are purposeful and have purposeful parts, all of which are contained in even larger purposeful systems. Systems thinking places concern on the way parts of a system interact, and, most importantly, with the conflicting or supporting purposes of the parts, the system, and the systems that contain it. When viewed through a system lens, complexity is a system of interacting problems and opportunities. Dynamic complexity concerns two seemingly opposable perceptions: holding worldview assumptions of a traditional linear, mechanistic approach that promotes understanding by reducing problems into manageable chunks, versus the evidence in the current reality where problems are dynamic, interactive, and defy reduction.

Design thinking is an approach and an action methodology for intervening in a problem or situation. It is to the systems approach as continuous improvement is to the scientific approach.[15] Design is a process that applies a different reasoning, and requires the ability to question prior or existing assumptions regarding the ultimate state to be achieved. Design thinking and design methodologies provide tools that specifically apply to complex contexts and to complexities. Rather than solving, design methods seek to dissolve a problem by looking beyond the constraints and assumptions of the immediate problem situation as defined. Design thinking makes use of the methods, techniques and tools of traditional clinical and research approaches, but uses them synthetically rather than analytically. Outcomes are creative and lead to innovative optimization of the whole rather than merely optimized parts.

Culture refers broadly to behavior, meanings, reactions, and values, norms working language, systems, symbols, beliefs and other elements by those who are part of it. Depending on the perspective, culture includes civilizations, communities, ethnic, religious and societal groups, and social and organizational groups. It can also include aspects and sub-groups such as a consumer culture, collective versus individual culture, and gun culture. Culture stands in the center of a process of change including a change in thinking and learning. For this reason it has generated metaphors such as organizational DNA, default setting of values,[16] default decision system, cement that glues people together, and shared mental image. Understanding how culture interacts with decision making and performance in complexity and how a positive and innovative culture is a strategic enabler (and vice versa) are critical concepts. The ability to fit into a complex and fast-moving social network is a key attribute of social intelligence, competitive fitness, and advantage.

Leadership attributes enable anticipation, recognition, and coping with sudden disruptions and navigating complexities. Attributes include cognitive capacities, behavioral abilities and styles, and emotional characteristics and skills that support early pattern recognition, avoidance of traps, and controlling/coping with and managing the emotional and stressful experiences of complexity.

Leadership attributes interact with relevant skills, accessing experience, knowledge and understanding of the situation, practical wisdom and sound judgment. Attributes are partly trait-based which means they can be measured with standardized assessments and that those who possess them should be sought for positions where complexities are anticipated; and they are state-based which means learning and mentor-based and team-based environments can facilitate development through an executive education program.

KNOWLEDGE OF ENABLING IT

New interdisciplinary technologies to assist with complexity in an increasingly nonlinear and rapidly changing world are being developed. The list of those currently being marketed include big data, cloud computing, predictive intelligence, visual decision modeling, complex systems modeling, machine learning, mobility, business intelligence, and more. It is becoming increasingly evident that the next generation of products, tools, services and information systems will need to exhibit two distinguishing features: one is a set of capabilities and behaviors that reflect built-in intelligence and the other is a set of capabilities and behaviors that are collaborative and integrated to amplify their overall effect. Technology with both sets of features will be more user-friendly, capable, effective and adaptive in responding to the needs and challenges of complex, changing and unpredictable environments. The answer is an integrative framework that enables effective interaction among these technologies to allow solutions to emerge. All knowledge can be dynamic, changing, and adaptive to new problems.

Aviation provides a relevant model. The aviation vision is for future flight deck systems to include systematic incorporation of “integrated displays and interactions, decision-aiding (decision-support) functions, information management and abstraction, and appropriate human/automation functional locations.”[17] It is possible, therefore, to create management dashboards that exhibit similar characteristics. Thus, future intelligent IT systems will sense internal and external threats, will evaluate them then they will provide key information to facilitate timely and appropriate responses. These advantages provide the pilots in the cockpits of the new IT to recognize relevant and critical patterns, enabling them to discernmeaningful trends and changes from noise.

GENERATIVE LEARNING FUNNEL

The final architectural component of the model is the *Generative Learning* funnel. *Generative* refers to a learning process that integrates current knowledge with experimentation and open-mindedness of new ideas that encourages individual and team creativity. Peter Senge[12] noted that "generative learning enhances our capacity to create [a way out]."

The program provides a structured experience with novel exercises that enable participants to recognize, transition through and to optimize the values and outcomes of five stages: data to information to knowledge to understanding to wisdom.[18] Moving through these phases is important because a major impediment of executive education programs is the exclusive focus on organizational learning – the acquisition of new knowledge. While data, information and knowledge are important, these are necessary but insufficient. A program must enable the participants to capture these but also understanding and wisdom. Table 1 presents the content of learning in terms of definitions, context and effects on decision making.

Table 1.

Learning Content and Effects on Decisions

Learning Content	Is Defined as	Is contained in	Has the following effects on decisions
Data	*Symbols* that represent objects, events, and/or their properties.	Raw Observations **Input**	No significant impact outside its existence
Information	Data that have been *processed* into useful form. The difference between data and information is in usefulness: information is functional; data are structural.	**Descriptions** of **what,** where, when, who, how many **Familiarity of Input**	Increases relational meaning and the probability of choice
Knowledge	Knowledge consists of *know-how* and of a *pattern of information* which makes maintenance and control of objects, systems, and events possible. Concerns *efficiency*: quantitatively doing things right	**Instructions** of **how** to do **Analysis of Output**	Increases probability of effectiveness of the courses of action

Under-standing	Understanding concerns the structure of multiple patterns which facilitates and accelerates acquisition of knowledge. Understanding helps to determine relevance of additional data and information.	**Explanations** of **why** and why to do **Synthesis Output**	Enhances Probable outcome = f (*prob. of choice x prob. of effectiveness*)
Wisdom	Enhances Probable outcome = f (*prob. of choice x prob. of effectiveness*) Understanding of fundamental and universal properties, patterns and structures of people, things, events, situations, and willingness, as well as the ability to apply perception, judgment, and action in keeping with the understanding of what is the optimal course of action.	Universal principles of reasoning and of disposition **Synthesis of Output**	Increases relative value of the intention situation leading to optimal choice

Table 2 demonstrates how participants transition through the learning stages. Individuals and teams work on engaging exercises that apply to ongoing organizational challenges in terms of their usefulness. In addition, at each stage, exercises demonstrate the application of enabling technologies to improve decision making.

For example, to seek and acquire the appropriate data about the environment of an organization requires the appropriate filter or mindset, in particular, systems thinking. This is followed by application of the situation awareness (SA) model. SA is the perception of internal and external environmental elements in terms of time and/or space, the comprehension of their meaning, and the projection of their status after some variable has changed.[19] From this, perceptions about current reality shift from tunnel vision to 360 radar scope. Processing data, for example, via a relational database produces useful information.

For example, transitioning from information to knowledge involves acquiring new knowledge through the integration of information, experience and theory. This can be appreciated through the Cynefin framework 13 which presents requirements for different decision contexts. Using systems thinking as a mindset also has implications as conflicting interests are balanced through the application of stakeholder theory.

Table 2.

Sample Content of the Program

Transitioning from Stages in the Learning Funnel	Program Topics	Enabling Technologies
From Data to Information Data Processing)	Systems Thinking filter or Mindset -Situation Awareness Model (Perceptions) -From Tunnel Vision to 360 Radar Scope -Systems Thinking System Analysis Obstruction Analysis	Data Mining - *Anomaly Detection, Dependency Modeling* Cloud Computing - *Virtualization, PaaS, IaaS, SaaS, Distributed Cloud* Grid Computing - *Grid Workflows, Data Vault Modeling, Multitenancy* Database Management – *Data Warehousing, Online Transaction Processing* Dimensionality Reduction - *Principal Components Analysis, Feature Extraction* Visualization - *Multiway data analysis*
From Information to Knowledge (Theory and Experience)	Requirements for Different Decision Contexts (Cynefin) Situation Awareness Model (Comprehension and Projection) Stakeholder Theory Influence Diagram Transductive Inference	Supervised Learning – *Classification Algorithms, Decision Trees* Unsupervised Learning – *Nearest neighbor clustering* Structured Prediction - *Bayesian Nets, Logistic Regressions, Time Series, Structural Equation Modeling*
From Knowledge to Understanding (Appreciating impact of Assumption modification)	Problem Solving Strategies -Emergence -Resilience/Agility -Design Thinking -Decision Support Systems -Crowdsourcing -Network organizations	Tradespace Exploration – Multiplecriteria decision analysis (*MCDA*) Optimization Real Options Analysis Epoch Era Analysis Agent Based Simulation – *Monte Carlo Methods, Game Theoretic*
	-Co-creating solutions through networks	*Elements, Emergence* Discrete Event Simulation – *Network Simulation* Evolvability Analysis – *Markov Processes*
From Understanding to Wisdom	Cross-Domain Pattern Recognition Individual and wisdom of the crowd	Artificial Neural Networks – *Radial Basis Functions*, *Multilayer Perception* Inductive Logic Programming

SUMMARY

There must be an awakening by executives to the existence and emergence of a new, unique class of dynamically complex problems for which conventional formulations, solutions and executive education are sub-optimal and

inadequate. The failure to attain expected results in spite of great effort is to a great extent attributable to the absence by leadership to distinguish and recognize these types of problems from those that are normal. While there is much written about such problems in the management literature, many within organizations remain unaware of or what to do about them. Worse, many continue to shoehorn old business models into new problem sets and technology.

In the management sciences, such a characterization covers some essential aspects of the worlds with which leaders and managers have to cope. Leaders and managers face situations in which the following characteristics are present: (1) it is not clear which activities are relevant to competitive advantage over others; (2) it is not certain how or to what extent these activities are interdependent or dependent upon other factors not yet known or discovered; and (3) the environment to a manager often appears ill-structured, dynamic, and uncertain. Despite these descriptions, leaders, consultants and organizations lack the proper perspective and appropriate competencies to formulate such kinds of problems as well as to invent creative ways of seeing and perceiving solutions. Therefore, the challenge remains to recognize this phenomenon and to consider alternative approaches, particularly in executive education where organizational dynamics affect the pace, direction, and pattern of relationships, and, therefore, greater competitive advantage.

REFERENCES

[1] From Clayton Christensen: http://www.claytonchristensen.com/key-concepts/.

[2] From Peter Drucker:
http://www.forbes.com/2004/11/19/cz_rk_1119drucker.html.

[3] From Fred Emery and Eric Trist: http://www.moderntimesworkplace.com/archives/ericsess/sessvol3/GEMTRCAUp53.pdf.

[4] About strategic blindness: http://www.nationalreview.com/article/379027/strategic-blindness-conrad-black.

[5] Quy Huy and Timo Vuori: http://knowledge.insead.edu/strategy/what-could-havesavednokia-and-what-can-other-companies-learn-3220-#k7ZdIVUebVQarFFd.99 .

[6] From News.Com Australia. See: http://www.news.com.au/travel/travelupdates/how-pilot-captain-richard-de-crespigny-and-his-crew-saved-qf32-fromaviationdisaster/story-fnizu68q-1226860221061.

[7] From Vince Barabba: http://www.triarchypress.net/the-decision-loom.html.

[8] From Paul Mason: http://www.bbc.co.uk/blogs/legacy/newsnight/paulmason/2011/02/twenty_reas ons_why_its_kicking.html.

[9] Internet Century: From *How Google Works*: http://www.howgoogleworks.net/

[10] Drucker, P. *Landmarks of Tomorrow.* New York: Harper & Brothers, 1959.

[11] Pagano, K. O. *Immersive learning*. Alexandria, VA: American Society for Training & Development, 2013.

[12] From Peter Senge: http://infed.org/mobi/peter-senge-and-the-learningorganization/.

[13] Snowden, D.J. Boone, M. 2007. A Leader's Framework for Decision Making. *Harvard Business Review*, November 2007, pp. 69–76.

[14] Pourdehnad, J., Wexler,E. R. & Wilson, D.V. Systems & Design Thinking: A Conceptual Framework for Their Integration: http://repository.upenn.edu/od_working_papers/10/ .

[15] Van Gigch, John. Applied General Systems Theory. New York: Harpers and Row, 1978.

[16] Gharajedaghi, J. *Systems thinking Managing chaos and complexity*, 3rd Edition. Burlington, MA: Morgan Kaufman/Elsevir 2011.

[17] From NASA: http://www.aeronautics.nasa.gov/avsafe/iifd/.

[18] Ackoff, R. L. *Recreating the corporation*. New York: Oxford, 1999.

[19] Endsley, M.R. The role of situation awareness in naturalistic decision making. In Zsambok, C.E. & G. Klein (Eds.), *Naturalistic decision making* (pp. 269–283). Mahwah, NJ: LEA, 1997.

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