Improving Decision Making in Complexity Environment

Iwona Gorzeń-Mitka a,*, Małgorzata Okręblicka a

aFaculty of Management, Czestochowa University of Technology, Czestochowa, Poland

Abstract

Volatility and complexity factors determines the management and decision-making approach in organization. The aim of this paper is to point out that the specific features of company environment (complexity, uncertainty, limitation of skills and abilities) necessitate them to search for new management approaches that fit in with the new challenges. The features of the areas of complex system and complexity decision-making have been indicated as elements one of selected sense-making approach - Cynefin. Cynefin has been used in a range of contexts to support decision-making in dynamic and challenging situations. We conclude how this approach may help in management and complexity decision-making support.

Keywords: Decision-making approach, Management, Cynefin framework, Complexity.

1. Introduction

Complexity and uncertainty which characterize the environment in which enterprises are functioning, force them to continuously improve and search for new, often unconventional solutions for shaping decision making processes. It refers both to organizational, technological and managerial solutions. In the situation of dynamically changing external and internal conditions of its functioning, an organization can survive and grow only when it is able to successfully adapt its changeability to the changeability of the environment in which it is operating (Penc, 2002, p.51). The existing and applied systems of decision-making are often inadequate to the new challenges encountered by enterprises. This is stressed e.g. by D.Jamali (2005, pp.104-105) in his work Changing management paradigms: implication for educational institutions, who points out that improvement in this area is becoming a requirement that must be met by modern entities to be able to conduct business.

* Corresponding author.

E-mail address: iwona.mitka@zim.pecz.pl (Gorzeń-Mitka Iwona), m.okreglicka@wp.pl (Okręblicka Małgorzata)

© 2014 The Authors. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/3.0/).

Selection and/or peer-review under responsibility of Scientific Committee of IECS 2014

Keywords: Decision-making approach, Management, Cynefin framework, Complexity.
Looking for new paradigms implies searching for management methods that fit in with the new challenges connected with the complexity, uncertainty and instability of the environment in which organisations operate. Further, the paper will present the basic assumptions and possibilities of using Cynefin framework for analysing complex decision making processes.

The aim of this paper is to point out that the specific features of company environment (complexity, uncertainty, limitation of skills and abilities) necessitate them to search for new management methods that fit in with the new challenges.

Against this background, the features of the areas of complex system and complexity decision-making have been indicated as elements one of selected sense-making approach.

As the paper functions as an illustration, the main method is overview of the literature of the subject in the selected scope of discussion.

2. Decision-making under complex environments

Current economic activity is characterized by the forces of globalization, technology, deregulation and democratization collectively creating an extremely complex operating environment for companies and policy-makers. This uncertainty and complexity creates risks but also opportunities to create new competitive advantage. This is stressed e.g. by M. Uhl-Bien, R. Marion, B. Mckelvey, B. in their work “Complexity leadership theory: Shifting leadership from the Industrial Age to the Knowledge Era” (2007, pp.298-318). This article draws from complexity science to develop an overarching framework for the study of Complexity Leadership Theory, a leadership paradigm that focuses on enabling the learning, creative, and adaptive capacity of complex adaptive systems within a context of knowledge-producing organizations. Authors develop and outline key elements of Complexity Leadership Theory. Their propose new conceptual framework includes three entangled leadership roles (i.e., adaptive leadership, administrative leadership, and enabling leadership) that reflect a dynamic relationship between the bureaucratic, administrative functions of the organization and the emergent, informal dynamics of complex adaptive systems.

Complexity is a new way of thinking about the world (Snowden Boone, 2007), but modern complexity theory has its roots in the work on general systems theory done by Ludwig von Bertalanffy during the late 1940s and 50s as well as in Weiner’s work on cybernetics in roughly the same period. Later scholars such as Beer, Churchman, Byrne, Beinhocker, and Forrester extended modern complexity theory and these concepts into the sphere of systems management in fields as diverse as finance, health care, ecology and numerous social sciences while others. By the 1980s, researchers at the Santa Fe Institute attempted to unify some of these core concepts into a model known as a complex adaptive system. While this model shares commonality with elements of all the preceding theories, the nature of complex adaptive systems is in many ways an entity unto itself and still an evolving construct (Snyder, 2013, p. 11).

Management science generally admires order because it provides structure and predictability. It should be stressed at this point that the growing gap between management theory and business practice that has emerged over the years led to the development of a new paradigm which should ensure constructional coherence of these areas. At the foundation of this paradigm, there are four aspects of present reality: customer needs, quality, systemic management, and innovations. Changes in the paradigm are manifested in many aspects connected with the functioning of an enterprise: e.g. in the change of an enterprise’s organizational structure where we see a change from a functional (characteristic for the “classical” approach) structure to process-based or network structures which are characterized mainly by flexibility and adaptability to changes in the environment (Gorzeń-Mitka, 2013, p.13). Complexity is argued as being coherent in retrospect, because in complex organizational systems order is emergent in nature and formed by the interaction of many agents (Snowden, 2005, pp.45-54; Cilliers, 1998). P. Cilliers (1998, pp.3-4) developed a description of ten characteristics of complex systems, outlined in Figure 1.

Managing in the face of complexity should be guided by three key principles: decentralized, collaborative and adaptive management (Hummelbrunner, Jones, 2013). Decision-making in today’s complex environment requires operating effectively under conditions of uncertainty and rapid change. Strategic decision-making in complex environments requires teaching meta-cognitive skills that provide leaders with a „tool-bag” of decision-options to use when confronting novel situations. This also requires the development of innovative and adaptable decision models beyond the linear thinking underlying the rational actor model that has characterized traditional strategic decision-
making (Franke, 2011, p.12). R. Hummelbrunner and H. Jones (2013, pp.24-25) stressed three key barriers to change current management view:
1. First - a shift in the mind-set of key decision-makers (e.g. donors, programme directors) to cope with the uncertainties of more complex tasks or realities. Decision-makers should depart from ‘command and control’ management traditions and be more open to adaptive approaches that are responsive to contextual changes and lessons learned from implementation. Instead of attempting to avoid risk and clinging to rigid plans, they should engage in risk management, because a limited and well-calculated approach to risk-taking during implementation can prove more effective.
2. Second - integrating new approaches procedures and more adaptive management tools with existing tools and frameworks.
3. Third - prevailing incentives and agency systems need to alter (particularly on resource allocation and accountability). Current practice and rules with respect to performance / results-based management should be revised to counteract their often different from the expected effects in complicated or complex situations.

Figure 1. The characteristics of complex systems

- a - small causes can have large results, and vice versa
- b - the short range: information is received primarily from immediate neighbors
- c - the long range: influence gets modulated along the way and can be enhanced, suppressed or altered in number of ways.
- d - positive: enhancing & stimulating
- e - negative: detracting & inhibiting
- f - They interact usually with their environment. It is often difficult to define the border of a complex system.
- g - not only evolving through time; the past is co-responsible for present behavior. Any analysis of a complex system that ignores the dimension of time is incomplete.

Source: own study based on: (Cilliers, 1998, pp. 3-4).
Complexity heightens the importance of effective management, but poses challenges for the tools and approaches used most widely. There are founded predominately on the assumption of high certainty, consensus, and concentrated capacities, making them less appropriate for complex situations. A solution of this problem would be to follow the growing trend in management for contingency, i.e. moving away from regarding management approaches as a universally applicable set of principles, towards advocating that they should be chosen to match the situation at hand (Hummelbrunner, Jones, 2013, p.7). One of the methods that take into account variety and specificity of modern conditions of management is Cynefin framework.

3. Modeling of complexity environment

Literature describes several sensemaking models, for example, a cognitive Data/Frame model (Sieck, Klein et al. 2007) or a behavioral model (Powers, Stech et al. 2010). While these models are useful to enhance sensemaking of individuals or teams, they do not treat sensemaking in the context of the environment. One of models, that explains and supports complex decision making processes in the choice of a strategy for action is Cynefin. The Cynefin framework advocates the use of narrative for understanding complexity and emphasizes the social aspects of sensemaking while taking into account various environmental circumstances. Cynefin was originally developed in 1999 by D. Snowden during works on models of knowledge management and business organisation strategies (Snowden, 2000). From 2002, works began to include in this model the theory of complex adaptation systems, which resulted in Cynefin becoming a model of a general strategy (Snowden, 2002, pp.100-111). D. Snowden’s works were conducted in cooperation with C. Kurtz (Kurtz, Snowden, 2003) at Institute of Knowledge Management IBM, and since 2005 (after D.Snowden left IBM) works on the model have been continued as part of the Cognitive Edge network †. 

Cynefin framework suggests four basic approaches to strategic decision-making, depending on the level of contextual uncertainty. At the same time, it indicates good practices which, according to the idea of Cynefin, should be tailored to the individual specificity of the situation in which a given organisation finds itself. In practice, the model can be used as a tool supporting project, team and organisation management, and even for analysing international problems (Snowden 2010).

The Cynefin model consists of three main elements: Graphical model (see figure 2); a set of methods; a software package Sensemaker, which enables visual presentation and interpretation of the results.

The Cynefin model consists of five areas (domains) (Kurtz, Snowden, 2003). It is presented in figure 1.

† Within Cognitive Edge network D.Snowden cooperated with Mary E. Boone. The study focused on expand the model of leadership and business process aspects. See: (Snowden, Boone, 2007, pp. 69-76).
The areas are:

1. Simple – the relationship between cause and effect is obvious for everyone. The proposed action scheme: sense–categorise–respond. When taking the actions we can apply the best practices.

2. Complicated – the relationship between cause and effect requires analysis or a different form of investigation and/or the application of expert knowledge. The proposed action scheme: sense-analyze-respond. When taking the actions we can apply the good practices.

3. Complex – the relationship between cause and effect can be noticed only in retrospect; it cannot be predicted in advance. The proposed action scheme: probe-sense-respond. The effect of the actions taken can be a discovery of emergent practice.

4. Chaotic – there is no relationship between cause and effect at systems level. The proposed action scheme: act-sense-respond. We can discover novel practice.

5. Disorder – placed in the middle of the framework. D. Snowden i M.E. Boone describe it as follows:

“The very nature of the fifth context—disorder—makes it particularly difficult to recognize when one is in it. Here, multiple perspectives jostle for prominence, factional leaders argue with one another, and cacophony rules. The way out of this realm is to break down the situation into constituent parts and assign each to one of the other four realms. Leaders can then make decisions and intervene in contextually appropriate ways” (Snowden, Boone, 2007, p.73).

It is important to stress that the four domains do not constitute mutually excluding categories, and the boundaries between each of the domains are blurred. This results from the existence of so-called transitional areas between them, because the conditions in which decisions are made and situations which they refer to may often be at the borderline of individual domains.

The proposed domains describe basic types of decision making situations (simple, complicated, complex and chaos). As the authors of the model stress, the introduction of this differentiation is important from the perspective of
a smooth and effective use of resources. For instance, simple situations, due to their predictable character, are easier to manage, and thus require using less resources (e.g. people, finances, time) in order to achieve target effectiveness (Okręglicka 2012, pp.193-202). However, adopting the same action schemes for managing complicated or complex situations may lead to completely different effects. Because the decisions that are made may be based on wrong assumptions concerning the relations between actions and their consequences, they may result in the situation where the resources have been used but not as effectively as it had been assumed or even it is necessary to incur additional expenditure connected with failures or additional controls (reviews) (French, 2013, pp.547-561).

4. Application of Cynefin model

The Cynefin model shows a new perspective of looking at a decision making system in organisations. The ease of using this model, together with its innovativeness, make it „a kind of guidance for managers on their thoughts and actions” (McLeod, Childs, 2013, pp. 299-309). At the same time, the model shows a new perspective of looking at various situations and indicates what actions should be taken as response to various situations. For that reason, it is more and more often and willingly used in business practice (analysis of G.W.Bush administration's policy (O’Neill, 2004, pp.149-156), analysis of the supply chain (Shepherd et al., 2006, pp. 313-327) and qualitative data (McLeod, Childs, 2013, pp. 299-309).

Additionally, the Cynefin framework can assist evaluators in identifying various causal dynamics. Each of the four zones is distinguished by a different kind of causal relationship, a different dynamic. Using Cynefin to view a situation helps evaluators to see various types of causality, and counteracts tendencies to represent an evaluation situation as either a linear logic model or a complex adaptive system.

The framework also includes strategies for approaching and understanding causal dynamics in each zone. Once evaluators have mapped situation aspects into different dynamic zones, Cynefin provides guidance on measurement methods suited to capturing the dynamics of each zone. The framework also helps to communicate the reasoning behind those choices better with clients and to provide a basis to engage them in evaluation planning (Britt, 2011).

There are three main steps in using Cynefin model to select methods for an evaluation design (Britt, 2011, p. 5).

1. Assign each evaluation question to the right zone of the framework.
   
   In this step, evaluation questions are analyzed using the Cynefin framework and assigned to one of the four domains. The evaluator may undertake this task, or s/he may broaden the discussion to include various stakeholders. Those with experience facilitating exercises with Cynefin for groups have valuable guidance to offer about ways to engage stakeholders productively in this process.

2. Select evaluation methods to answer each question. In this step, the evaluator assigns appropriate methods to each evaluation question.

3. Integrate the key questions and methods into a coherent evaluation design.

   One of extensively documented project, where use Cynefin framework is AC+erm Project "Accelerating positive change in electronic records management" (AC+erm project, 2013). It ran from 2007 to 2010 and aimed to investigate and critically explore issues and practical strategies to support accelerating the pace of positive change in managing electronic records. It focused on designing an organisational-centred architecture from three perspectives:

   1. people, including vision, awareness, culture, drivers and barriers;
   2. working practices including processes, procedures, policies and standards;
   3. technology in terms of the design principles for delivering effective recordkeeping.

   The Cynefin synthesis activity was undertaken in 2012 to 2013, after the project completed.

   The evaluation demonstrates that the Cynefin framework provides a strategic lens through which to view electronic records management. Cynefin prompts new questions to be asked, leading to new insights and a deeper understanding of the electronic records management challenge. Most significantly, it provides a new construct for re-perceiving the challenge in a holistic way and offers a strategic approach to taking action for change. This evaluation suggests that it is an appropriate and effective framework for use in qualitative research on challenging information management problems, with the potential to support the transfer of research into practice.
As a result, it was found that different dynamics in a situation require different evaluation approaches to discover and measure what is happening and why it is happening. The implications for evaluation are diverse. Some of them (Britt 2011, AC+erm project 2013):

1. In simple zones where cause-effect relationships are known, useful evaluation practice may be limited to tasks such as monitoring against targets and validating best practices. Standard operating procedures and process re-engineering are preferred techniques in this area. Hierarchical style is most recommended in management. Coordination is typical work pattern. Connections (networks in the organization) should be strong between the board (managers) and the constituents (workers) and weak between individual constituents (workers).

2. Complicated aspects are better addressed by linear logic modeling tools and standard social science research methods.

Scenario planning, business intelligence and systems thinking are preferred techniques in this area. Oligarchic-consensual style is most recommended in management. Co-operation is typical work pattern. Connections (networks in the organization) should be strong between the board (managers) and the constituents (workers) and between individual constituents (workers).

3. Complex aspects require evaluation approaches that allow for learning in emergent situations (i.e., those in which outcomes cannot be fully predicted).

Complex adaptive systems thinking is preferred method in this area. Information-consensus style is most recommended in management. Collaboration is typical work pattern. Connections (networks in the organization) should be weak between the board (managers) and the constituents (workers) and strong between individual constituents (workers).

4. Chaotic components are not well-suited for most evaluation approaches, as stakeholders are focusing on survival in crisis. Crisis management is preferred method in this area. Decisive-directive style is most recommended in management. Compliance is typical work pattern. Connections (networks in the organization) should be weak between the board (managers) and the constituents (workers) and between individual constituents (workers).

5. Conclusions

Complexity and uncertainty of the environment in which today’s organizations operate determines the search for new management methods that fit in with the reality. One of such methods, which is attracting an increasing number of supporters, and at the same time is simple and enables an analysis of multifaceted and multidimensional situations is the Cynefin method. It is constantly evolving. The model constitutes a very valuable and useful tool in diagnosing problems, and taking decisions and actions in complex processes. Cynefin offered a paradigm shift and the tools to go with it. The framework’s immediate appeal was its ability to distinguish between the simple, complicated and complex aspects of the situation. Early in the process, initial drafts of evaluation questions outlined broad areas of interest. Using the framework, we can see that different causal dynamics were operating in each of the areas of interest. Cynefin application has two-pronged benefits for organization: as a tool to illustrate sensemaking activities and also as a sensemaking tool to explore different perspectives of the data and thus to gain an integrated picture of that data.

References

AC+erm project - Project Output: People Issues and Solutions to Use or Avoid – Synthesis Using the Cynefin Framework (2013), Northumbria University. Available at http://www.northumbria.ac.uk/acerm
Britt H. (2011), Using the Cynefin framework in evaluation planning: A Case Example, Available at www.heatherbritt.com
Cilliers, P. (1998). Complexity and Postmodernism: Understanding. New York, NY: Routledge.
• Franke V., Decision-Making under Uncertainty: Using Case Studies for Teaching Strategy in Complex Environments, Journal of Military and Strategic Studies, Volume 13, Issue 2, Winter 2011, p.12.
French S. (2013), Cynefin, Statistics and Decision Analysis, Journal of the Operational Research Society, Vol. 64, pp. 547-561. Available at http://www.palgrave-journals.com/jors/journal/v64/n4/full/jors201223a.html
Gorzeń-Mitka I. (2013), Problemy doskonalenia zarządzania przedsiębiorstwem, Sekcja Wydawnictw Wydziału Zarządzania Politechniki Częstochowskiej, Częstochowa, s.13.
Hummelbrunner R., Jones H., A guide to managing in the face of complexity, Working Papers, October 2013, Overseas Development Institute.
Jamali D. (2005), Changing management paradigms: implication for educational institutions, Journal of Management Development, vol.24, 2005, pp. 104-105.
Kurtz C. F., Snowden D. J. (2003), The new dynamics of strategy: Sense-making in a complex and complicated world, IBM Systems Journal 2003, Volume 42, Number 3.

McLeod J., Childs S. (2013), The Cynefin framework: A tool for analyzing qualitative data in information science?, Library & Information Science Research vol. 35, 2013, pp. 299–309.

O’Neill L.J.(2004), Faith and decision-making in the Bush presidency: The God elephant in the middle of America’s livingroom, Emergence: Complexity and Organisation, 2004, Vol. 6, No. 1/2, pp. 149–156 Available at http:// emergentpublications.com/eco/ECO_other/Issue_6_1-2_20_FM.pdf

Okręglicka M. (2012), Działalność inwestycyjna w sektorze małych i średnich przedsiębiorstw w Polsce w latach 2009-2011, in: Otocezenie współczesnych przedsiębiorstw - specyfika i zmiany. A. Gierczak, J. Wiażewicz, A. Zielińska (ed.). Oficyna Wydawnicza Politechniki Rzeszowskiej, Rzeszów, pp. 193-202.

Penc J. (2002), Przedsiębiorstwo w burzliwym otoczeniu. Procesy adaptacji i współpracy, Oficyna Wydawnicza Ośrodka Postępu Organizacyjnego, Bydgoszcz, p. 51.

Powers, E., Stech, F. and Burns, K. (2010). A Behavioral Model of Team Sensemaking. The International C2 Journal, vol. 4/1, pp. 1-10. Available at http://www.dodccrp.org/files/IC2J v4n1_04_Powers.pdf

Shepherd R., Barker G., French S., Hart A., Maule J., Cassidy A.(2006), Managing Food Chain Risks: Integrating Technical and Stakeholder Perspectives on Uncertainty, Journal of Agricultural Economics, Vol. 57, No. 2, pp. 313–327.

Sieck, W. R., Klein, G. Peluso, D. A., Smith, L. and Harris-Thompson, D. (2007). FOCUS: a model of sensemaking. Arlington, Virginia: United States Army Research Institute for the Behavioral and Social Sciences. Technical Report 1200.

Snowden D. (2002), Complex Acts of Knowing: Paradox and Descriptive Self Awareness, Journal of Knowledge Management, Vol. 6, No. 2, May 2002, pp. 100-111.

Snowden D., Boone M. E. (2007), A Leader's Framework for Decision Making, Harvard Business Review, November 2007, pp. 69-76.

Snowden D. (2010), The origins of Cynefin, Part 1-7 Available at http://cognitive-edge.com/blog/entry/3505/part--one--origins--of--cynefin

Snowden D.: Cynefin, A Sense of Time and Place: an Ecological Approach to Sense Making and Learning in Formal and Informal Communities, conference proceedings of KMAC at the University of Aston, July 2000 Available at http://www.governica.com/Cynefin/ref-6

Snowden, D. (2005). Multi-ontology sense making: a new simplicity in decision making. Informatics in Primary Care, vol.13(1), pp. 45-54 Available at http://cognitive-edge.com/uploads/articles/40_Multi-ontology_sense_makingv2_May05.pdf

Snyder, S. (2013), The Simple, the Complicated, and the Complex: Educational Reform Through the Lens of Complexity Theory, OECD Education Working Papers, No. 96, OECD Publishing:p.11.

Uhl-Bien M., Marion R., McKelvey B. (2007). Complexity leadership theory: Shifting leadership from the Industrial Age to the Knowledge Era. The Leadership Quarterly, vol.18/4, pp. 298-318 Available at http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1017&context=leadershippub

Dettmer H. W. (2011), Systems Thinking and the Cynefin Framework. A Strategic Approach to Managing Complex Systems, Goal Systems International, 2011, Available at http://www.goalsys.com/books/documents/Systems-Thinking-and-the-Cynefin-framework-Final.3.pdf