Journal of Fundamental and Applied Sciences

ISSN 1112-9867

Available online at http://www.jfas.info

Research Article

Special Issue

STRATEGIC MANAGEMENT IN THE COMPLEXITY PARADIGM

V. Khashei[1], I. Ashofteh[*,2]

[1]Assistant Professor, Faculty of Management & Accounting, Allameh Tabataba'i University, Tehran, Iran

[2]Ph.D. Candidate, Faculty of Management & Accounting, Allameh Tabataba'i University, Tehran, Iran

Published online: 15 February 2016

ABSTRACT

In this paper, the dimensions of the new paradigm, the paradigm of complexity and its impact on strategic management are examined. The results of this study show that, since the fundamental issue of strategic management in turbulent environments is to achieve creativity which can adapt with a turbulent environment as well as maintaining stability, strategic management in complexity paradigm will not be a rational formulation of the strategic plan which is then implemented and controlled. In this paradigm, however, the creation of strategy should be an emergent and self-organized process that arises from spontaneous group discussion between directors and managers on strategic issues. Implementation of strategies should also be flexible and at the same time, orderly. Decision-making should be decentralized, and provide and facilitate learning and experiencing. Also; the personnel should be encouraged to change. The control should be done locally and through the personnel. Managers must provide members with the information needed for this approach and exert control through the members or their teams.

Keywords: complexity paradigm, strategic management, chaos, turbulent environment

Author Correspondence, e-mail: Iman@ashofteh.ir

doi: http://dx.doi.org/10.4314/jfas.v8i2s.464

1. INTRODUCTION

The today's challenge for managers is facing turbulent environments. While the majority of public management theories are based on certainty, predictability, and stability of the

environment, the environment is becoming increasingly more complicated and non-certain day by day. New technologies change the products, markets, business processes, and the entire industry and transform business environment. The traditional methods of scientific management rely on leaders to analyze, predict and control complex behaviors; but the world managers live in now is uncertain, unpredictable and even uncontrollable. In other words, while traditional science is focused on analysis, prevention and control, modern science focuses on chaos and complexity. The organization that seeks to shape a balanced relationship with the environment that is inherently unpredictable will be destroyed with its own hands. Such an organization is established on its strong points and compatibility with the environment and will surrender to the innovations of its competitors. In this study, the dimensions of the new paradigm, the paradigm of complexity and its impact on the management and the implementation of strategic management in this paradigm are examined.

2. DEFINITION OF COMPLEXITY

According to many theorists and scholars, the time of certainty and predictability has come to the end and uncertainty, chaos and paradigm shift is taking place (Brodbeck, 2002). According to Prigogine, Nobel Prize winner, now science has come to the point where uncertainty is more than clarity. Science should face the complexity of reality, with no fear of it. Thus, science cannot be limited to the study of accessible, visible, systematic and predictable concepts. Instead, science should focus on the concepts that their behavior is not easily predictable and precisely controllable. However, paradigm shift is difficult and the classic scientific paradigm will prevail, because a lot of people have invested in classic scientific paradigm, and on the other hand, scientists do not understand the complexity paradigm completely and transparently (Skurvydas, Kundrotas, & Valantiniene, 2013; Alvani&Danayifard, 2009).

Complexity theory has its origin from the natural sciences. Initial studies of the immune system, nervous system, ecology and insect communities resulted in complexity science that advanced to the study of artificial systems such as parallel and distributed computing systems, large-scale communication networks, artificial neural networks, evolutionary algorithms, large-scale software systems and economies (Brodbeck, 2002).

Complexity theory, complexity science, complexity paradigm, complexity worldview, and complexity meta-paradigm all are synonymous terms that refer to the study of complex adaptive systems (Skurvydas et al., 2013; Danayifard, 2006). The *complex* refers to the diversity. When it is said there is diversity in the system, there are several interactions among

its constituent elements. "Adaptive" refers to the capacity of transformation and change. So when the word “adaptive» is attributed to a system, the system's ability to learn through experience is intended (Danayifard, 2006).Hence, it can be said that while the classic science was seeking order, exact relations, complete transparency and objectivity, the new science examines whatever that the classic science has neglected (Skurvydas et al., 2013). Complexity theorists do not see our environment as linear, mechanical and action-reaction. But they haveaholistic, natural, and non-linear view to systems. Therefore, complexity theory can predict the output of the organization or system better (Brodbeck, 2002; Lichtenstein, 2000; Mukherjee, 2008; Danayifard, 2006).

Components or elements in a complex adaptive system are independent agents that interact in different ways. "Agent" may be a person, a molecule, a plant or animal species or an organization. These agents act on the basis of terms and conditions of their deployment. No organization, CEO, supervisor, or neuron control their gestures or actions. A complex adaptive system has the thick texture of condensed balanced agents in which every agent operates based on its specific plan and map, or knowledge. Thus, they have self-organized structures. These structures emerge through the process of actions. As a result, "the whole" is nothing more than the sum of members or components of the system (Danayifard, 2006).

A complex system can show emergent behavior. This behavior occurs when the focus of a scale goes to a larger scale. Ahuman phenomenon is emergent when it cannot be understood by specific studying of its elements (which can be each a system constructed from smaller scales). An emergent behavior is specific and unique to the desired scale and is produced by interactions between the components of the scale. In other words, predicting the behavior of a phenomenon toward its components using knowledge is difficult. This emergent behavior gives feedback to the influence of personal behavior of any of its components. For example, in industrial societies, the total corporate behavior, consumers and financial markets, make up the modern economy. In the brain also billions of neurons interact with each other to create complex patterns of behavior (Lichtenstein, 2000; Mukherjee, 2008; Tasaka, 1999).

Complexity of the system is not due to complicated rules, but also because of the interaction between a large number of constituent elements of the system. Simple rules or stimulation scan lead to the most complex behavior (Mukherjee, 2008). A slight difference in the start of process can gradually lead to a big difference in system performance. High number of interactions within the system can create unexpected patterns and behavior, because stimulation of a part of the system can have unpredicted effects on another part of the system (Mason, 2007).

When an agent changes its behavior based on the events during interaction, these systems are adaptable or flexible and will organize themselves. If the force or the environment in which these agents operate has an effect on their process, the adaptive change that leads to getting desirable result will occur (Brodbeck, 2002).

The combination of structure and emergence leads to self-organizing. Self-organization happens when an emergent behavior can lead to a change in the structure or even creation a new structure. Each higher level has its own scale and each new level, has the new relations and characteristics. In other words, a complex system in one level is composed of complex systems at lower levels which are in interaction with each other and together they create a higher level. There is no control point in complex systems. Complex system should cultivate various species, but we cannot expect a complex system to monitor the diversity of species. It can only stimulate the system and observe the response of system. For example, in the brain, there is no supervision neuron that has the central control over all behaviors (Mukherjee, 2008).

3. STRATEGIC PLANNING IN COMPLEX SITUATIONS

Authors of complexity and chaos all agree that traditional strategic planning is not efficient in turbulent environments. Traditional strategic planning is not creative, innovative and original and produces rigid strategy. It is because traditional strategic planning is based on the following:

- Information that will be obsolete by the end of the strategic planning process.
- Assuming environmental sustainability.
- The assumption that the organization can somehow control its surrounding environment.

The inefficiency of traditional strategic planning is partly due to failure in predicting environments at chaos border, since system is constantly and unexpectedly changing and thus managers should continuously obtain new information to understand the environment. Therefore, each plan becomes invalid before implemented. And employees, who would be faced with environmental shocks, have been enclosed by detailed plans (Mason, 2007).

In fact, much of the literature on strategy is the debate between two schools of "planning" and "learning". Planning school depicts strategic management as analysts equipped with advanced equipments of forecasting. And the outcome of the strategic analysis is expected to provide a deep knowledge about the environment and how to obtain competitive position in the market based on the organizational resources. But this stability is not welcomed by the other

paradigm, the paradigm of learning. In this paradigm, the market is constantly changing as a set of processes in which the tireless entrepreneurs are constantly seeking opportunities to engage. In this paradigm, organization's strategic position is obtained by an emergent process of innovation of managers and employees in response to market realities. Recently, a third paradigm is proposed that mixes the features of the two schools of learning and planning and takes the internal consistency with the external inconsistency together into account. Organizations that operate in very dynamic markets should be both stable and flexible (Cunha & Cunha, 2006).

The main purpose of strategic planning is to guide the organization by evaluating current practices and exploring future goals in the light of the mission of the organization. For strategic planning in the complexity paradigm, it is necessary to understand the forecast horizon. That is, to what extent strategist can predict future events. Forecast horizons can be clear and transparent, turbulent, or complex (Mukherjee, 2008).

Faced with clear horizons, strategist can visualize different scenarios that could emerge in certain circumstances to identify the factors that are certain in that environment. When the forecast horizon is full of turbulence, strategist is aware of several modes that may occur, but because of the large number of possible modes, depicting all forms is difficult. However, the strategist believes that he will be able to realize the key events at specified time intervals, and respond efficiently. Thus, the unimaginably large number of possible outcomes and the difficulty of assessing probabilities, let alone assigning values, forces strategic planning to become the organization of processes of continuous experimentation, exploration and subsequently adaptation. But when the forecast horizons are complex, the main problem is not only that strategists make their way through the perspective of unstable and uncertain factors, but that the social landscape constantly changes in response to the actions he and others do and new features that were not anticipated and are constantly emerging. Since the final destination of strategists is always somewhere beyond the today's predictable horizon, the relationship between what he is doing and the direction he moves is always fragile and ambiguous. In organization, this issue has led to attempts to create self-organization and co-evolution such as learning circles, peer learning groups, systems thinking and so on. There may not be a foreseeable future, but we should continually work to build the future. The emphasis on learning organizations with the need to build the future, lead to some planning concerns as follows (Mukherjee, 2008; Tasaka, 1999):

- How can we be clear about our purpose and values and use them to structure modes of communication that support interconnectedness among the various stakeholders?

- How can we optimize and construct relationships in organizations so as to foster complexity and self-organization?
- How can we encourage resiliency in the organization to make reliable and complex decisions despite the large and often inconsistent number of inputs?

Strategic management in complex organizations is not done as the logical development of the strategic plan and then implementing it. In these organizations, decision-making and implementation are constantly under the influence of non-linearity. In these organizations, strategy is the result of interactions in the complex environment in which interpreting the reality, improvisation and creativity of the members of the organization are more important (Junior, Pascucci, & Murphy, 2012).

Improvisation requires a lot of experimentation and a structure that is not so rigid and could support change. A strategic framework to deal with the turbulent environment is that the organization creates chaos through continuous innovation, and, therefore becomes the first driver of turbulence among the competitors. Of course, the first stimulation alone is not enough, because competitors can use it to their advantage and the organization fails because of its competitors. Therefore, it is essential that creativity is sustained, even if at the expense of dropping the current product and replacing it with a new product before competitors do. In addition, the organization must formulate a framework that provide the ability to adapt to the environment faster than competitors, is flexible enough to adapt to the environment, willing to take the risk of errors caused by quick decisions and learns from these mistakes, and benefit from strategic alliances to increase competencies (Mason, 2007).

Complexity theorists emphasize on the importance of embracing change, accidents and organizational turbulence. According to them, strategy is an emergent phenomenon, not a preset one (Danayifard, 2006) and developing strategies in these circumstances should be a self-organized and emergent process that arise from a spontaneous discussion among group of managers on strategic issues (Stacey, 1992). Managers create the conditions in which individuals, teams and systems, are encouraged to respond spontaneously to changes in the environment and thus become able to self-organize and maintain their position in a fast changing environment (Mason, 2007). Since the strategy in turbulent environments should be flexible and at the same time, organized, the organization can impose a set of strategic rules, which help managers to deal with rapid environmental opportunities and threats, without the need to refer to above authority or following the slow process of strategic planning (Eisenhardt & Sull, 2001).

Also, by creating a reactive learning system, the changes of environment can be monitored and the problems and opportunities are immediately reported so that management will be able to make quick decisions when facing of turbulences of the environment (Mason, 2007).

Studies have shown that organizations that use self-organized management and emergent strategies are more successful in complex environmental conditions. In addition to the complex environment, they also have better performance in simple and stable environments (Mason, 2007).

5. STRATEGY IMPLEMENTATION IN A COMPLEX ENVIRONMENT

Strategy implementation is a huge challenge for the management of complex organizations. Terms of the complexity of these systems, challenges the implementation of strategy in these organizations. This challenge is because the traditional models do not consider the features of complex organizations. These challenges are because of certain features such as uncertainty, inability to forecast, and the high volume of interactions among autonomous agents (Junior et al., 2012).

That is why the strategy in these circumstances runs the other way. For example, more people are involved in the process, more importance is given to those who are closer to customers, and cross-functional teams are used. The implementation of strategy turns into a trial and error process and for this reason the planning cycles become shorter; also since quick responses are vital tactics overcome the strategies (Mason, 2007).

6. STRATEGY CONTROL IN COMPLEX ENVIRONMENTS

Most managers are trained to work in an environment of stability and certainty. While today, they are required to encounter increased uncertainty, turbulence and complexity. If in unstable environments, traditional control-oriented management style is used, it leads to devastating instability in relationships and behavior. So a sophisticated style of leadership is needed; a style that is transformer, facilitator, and influential. Mangers should specify the direction of organization and create an environment in which employees can work easily and the lower-level employees are directed in line with the movement of the organization. In other words, control should be local and through the people themselves rather than general and by higher-level managers. In the turbulent and complex environments, this is the best management style in an organization which is flat, lacks concentration and has a natural structure. Because such an organization can coordinate its sub-sections and smaller divisions with the changes by absorbing a high amount of environmental uncertainty and maintain its organizational

sustainability. In this case planning is still important, but should include short time horizons. Also, the information should be freely and quickly spread. This information should be about how to do a work instead of the work itself, and the possible outputs should also be considered. In other words, less forecast and control and more self-control should be employed so they can be quickly adapted to the new environment (Mason, 2007).

7. A MODEL FOR STRATEGIC MANAGEMENT IN COMPLEXITY PARADIGM

Cunha provided a model that focuses on the strategic management process in the complexity paradigm. In this model, instead of planning and then implementation, strategic management is considered as a process in constant turbulence that directs the organization forward by learning and implementing the feedbacks. Thus, strategic management is formed with improvised decisions surrounded by some simple rules that prevent the organization from collapse. These simple rules will play the role of control and while maintaining the freedom, identify the boundaries of activities to avoid a possible drift of the organization. In terms of complexity, strategy is the art of keeping the organization at the border of chaos, where freedom and guidance combine to make creative output. In this model, first the turbulent environment is considered as a variable affecting organizational structure that leads to simplification of the structure. Second, the impact of the turbulent environment on the need to spontaneous strategies and the role of organization structure are considered as well.

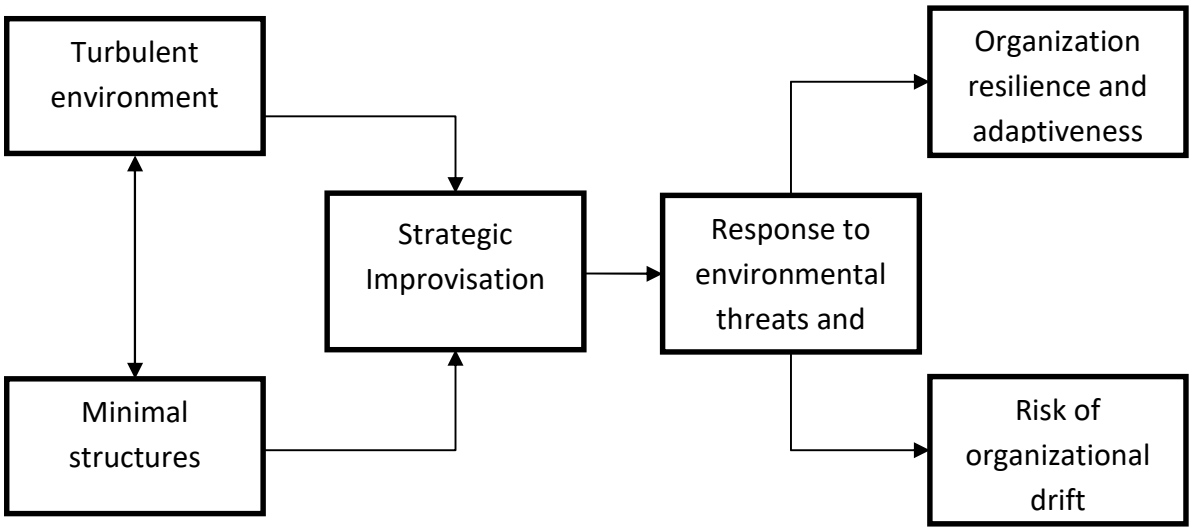

Fig.1. The model of strategic management process in complex environmental conditions (Cunha & Cunha, 2006)

8. CONCLUSION

In this study, the complexity paradigm theory and its application in organizations were examined. The main issue of strategic management in turbulent environments is to achieve a creativity which is adaptive with the border of chaos, and at the same time maintains the stability and smooth execution of the strategy. Therefore, to analyze strategic management in the complexity paradigm, it is necessary to understand the forecast horizon. Strategic management in complexity paradigm is not done through rational formulation of the strategic plan and then execution and control of it, but in this situation, decision-making, implementation and control are constantly under the influence of non-linearity. Strategic management in turbulent and complex environments should be such that the manger focuses on creating a domestic environment that is based on mutual cooperation. In this paradigm, successful strategies emerge from complex continued interactions between individuals. Strategy should emerge from the discussions of a group of directors and managers on strategic issues. The strategy should include organization's vision and identity, bottom-up strategy making by involving all the staff, rapid adaptiveness of structure balanced with environmental changes, and being pioneer in change before the environment forces organizations to change.

Implementation of the strategy in turbulent environments should be flexible and at the same time, orderly. Decision-making should be decentralized and learning and experiencing are facilitated, and the personnel should be encouraged to change. This requires a strategic set of rules that help managers to deal with rapid environmental opportunities and threats, without the need to refer to senior managers or follow the slow process of strategic planning, so it makes them capable of self-regulating and maintaining their position in a fast changing environment.

Strategy should also be controlled locally and through personnel. Managers must lead the organization and create an environment in which the employees work easily and the low-level staffs are directed in line with the organization movement. Managers should provide members with the information needed for this approach and lead the control through the members or teams.

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How to cite this article:
Ashofteh I, Khashei V. Strategic management in the complexity paradigm. J. Fundam. Appl. Sci., 2016, *8(2S), 215-224.*