ORGANIZATIONAL CHANGE WITH THE SYSTEM AND COMPLEXITY THEORIES IN MIND

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Abstract

The ability to successfully manage both internal and external generated changes has become a major source of competitive advantage for business organizations. This study tries to explore the system and complexity theory in line with organization change. The paper reviews organizational change through system theory, various critiques of system theory, complexity theory, dynamics of complex system, characteristics of complex system, and the implication of system and complexity theory for organization using relevant literatures. A good understanding of the two paradigms would become useful in addressing complex organizational dilemmas that may result as the organization tries achieving its goal and objective in a dynamic internal and external environment.

Introduction

Organizational change occupies a centre-stage of the academic and managerial scene (Pettigrew, Woodman and Cameron 2001). The ability of organizations to manage and survive change is becoming increasingly important in an environment where competition and globalization of markets are ever intensifying (Cao and McHugh, 2005). This situation is further complicated when the environment is marred by complexities of corruption and instability of government policies as found in a country like Nigeria. The organizational environment is comprised of a set of relationships between agents or stakeholders and other factors that may be beyond the control of the organization (Mason,2007; Iyayi 2005).

Although the system approach is an integrative model which harmonized the jungle of ideas that had characterized management thought (Inegbenebor, 2005), it does not fully take into note the organizational environment which is comprised of a set of relationships between agents or stakeholders and other factors that may be beyond the control of the organization (Mason,2007). With the ever increasing complexity of the organizational environment, the systems concept no longer seems adequate in dealing with complex phenomena. This shortcoming, among others, has led to the emergence of complexity theory. The ever increasing complexity of the organizational environment makes the system concept no longer adequate in dealing with complex phenomena. This shortcoming according to Amagoh (2008) has led to the emergence of complexity theory being more of use. In the complexity paradigm, systems are usually considered to be evolving or self-organizing into something new (Ferlie, 2007; Byeon, 2005; White, 2000).

By integrating complexity and systems theories, the disruptive, and fluid processes of organizational change may be better understood (Styhre, 2002).
This paper presents an organizational change through the perspectives of systems and complexity theories, and underscores that an appreciation of these two paradigms can aid organizational leaders in responding more effectively to the environmental uncertainties of contemporary organizations.

System Theory

The system approach is an integrative framework combining the ideas of scientific management, human relation school, behavioral science and management science approaches into a unified and cohesive whole. (Inegbenebor, 2005). A system comprises of subsystems whose inter-relationships and interdependence move toward equilibrium within the larger system (Martinelli, 2001; Steele, 2003; Inegbenebor, 2004).

Most conventional theories and models of organizations naturally embraced the closed systems approach to the study of organizations by assuming that the main features of an organization are its internal elements. While closed systems approach considers the external environment and the organization's interaction with it, to be for the most part inconsequential, open systems approach views the organizations' interaction with the external environment as vital for organizational survival and success (Amagoh, 2006). In open systems, any change in any elements of the system causes

changes in other elements (Iyayi, 2004). The lack of harmonization between the organization and its external environment in closed systems inhibit the organization's capacity to import sufficient energy from its environment for sustenance.

Since systems theory considers the input-transformation-output component and their interactions both within them and with the external environment (Inegbenebor, 2004; Inegbenebor, 2005), the elements of purpose, people, structure, techniques and information must be coordinated and integrated by the managerial system, in order to maximize value for the organization (Montouri, 2000). In open systems, the objective of transformation is to improve horizontal and vertical fit of the subsystems with each other, and within the organization. There must also be a fit between the organization and the external environment.

Critique of Systems Theory

Systems theory despite its relevance, it has its critics. Yoon and Kuchinke (2005) reflect that the systems model does not specify when and how collaboration with the organization needs to take place, nor what to do when the analysis suggests that there are existing or potential conflicts between the organizational environment, work environment, work, and the structure of the organization. These are issues that relate to uncertainty and thus challenge the organization to identify appropriate responses. The systems theory assumes that the boundaries between the organization and its environment are distinct (Fioretti and Visser, 2004) though; Castells (1996) states that differentiating boundaries and transformations are not always easy when organizations have multiple nodes of interactions and communication lines. Furthermore, in a rapidly changing environment where tasks and group compositions become intermingled, open-systems theory does not provide immediate answers to how organizations need to address such complex situations (Clippinger, 1999). Consequently, the open-systems model needs to be modified in situations in which the velocity and range of choices overpower stability and predictability (Sullivan, 2004).

Critics of systems theory also argue that it gives little direct guidance as to which aspects of the systems of interest should be manipulated to achieve policy objectives. According to Stewart and Ayres, (2001), systems theory does not appear to provide a way forward when constituents of the system are in conflict with each other and/or are very ill matched in terms of power and resources . Kast and Rosenzweig (1973) identify four major weaknesses of systems theory.

(i) The idea of comparing organizations to organisms as espoused in systems theory. They contend that we should be cautious in trying to make the analogy between living organisms and organizations too literal. In other words, organizations may be systems but not necessarily natural systems.

(ii) They also contend the dichotomy between closed and open systems, that there are difficulties in applying this strict polarization to social organizations. They stated that most social organizations and their subsystems are "partially open" and "partially closed". Thus, "open" and "closed" are a matter of degree.

(iii) Kast and Rosenzweig urge on the utilization of systems theory, that we should be more precise in delineating the specific system under study by being more specific about the boundaries of the system under consideration and the level of our analysis. In fact, Alter (2007) agrees on this shortcoming of systems theory, stating that one of the problems in trying to incorporate the general system theories (GST) ideas is that so many different systems come under the GST umbrella.

(iv) Kast and Rosenzweig finally added that the systems theory fails to recognize the fact that social organizations are contrived systems. With its predominant emphasis on natural organisms, general systems theory may understate some characteristics which are vital for social organizations. Social organizations do not occur naturally in nature, they are contrived by man. This means that they can be established for a variety of reasons and do not follow the life-cycle patterns of birth, growth, maturity, and death as biological systems.

Beeson and Davis (2000) argue that the systems perspective applied to organizations in its classic formulations but fails to give a sufficient account of change. The emphasis on boundary, environment, feedback and adaptive response presumes that management is readily identified as the control center, which directs the organization's operations. Thus, the model attributes a central role to management and overestimates management's power to control events and actions. This produces an impression that organizational change must be managed, and that managers can always manage change. Based on these criticisms, it seems attractive to consider a more transformational model of organizational change derived from the ideas of dynamic non-linear systems. The complexity and uncertainty of organizational change processes seem to be much better captured by complexity theory (Styhre, 2002; Price, 2004).

Complexity Theory

Complexity is defined as the measure of heterogeneity or diversity in internal and environmental factors such as departments, customers, suppliers, socio-politics and technology (Mason, 2007). Complexity theory focuses on how parts at a micro-level in a complex system affect emergent behavior and overall outcome at the macro-level (McElroy,2000; McKenzie and James, 2004). It is concerned with the study of emergent order in what otherwise may be considered as very disorderly systems (Sherif, 2006). As the complexity of a system increases, the ability to understand and use information to plan and predict becomes more difficult. Over time, the increasing complexity leads to more change within the system (Chakravarthy, 1997). As the system becomes more complex, making sense of it becomes more difficult and adaptation to the changing environment becomes more problematic (Mason, 2007; Cao and McHugh, 2005). Complexity theory paradigm rejects the mechanical ontological models, which assume linear causality between events and effects (Styhre, 2002). According to Rhee (2000), the characteristic structural and behavioral patterns in a complex system are due to the interactions among the system's parts. Complex systems tend to be deterministic in nature and evolve through a phase of instability, which eventually reaches another threshold where a new relationship is established between its internal and external environments and itself (Sullivan, 2004; McElroy, 2000). Systems that operate near a threshold of instability tend to exhibit creativity and produce new and innovative behaviors at the level of the whole system (Price, 2004; Styhre, 2002).

Dynamics of Complex Systems

An essential feature of the complexity theory paradigm is the concept of complex adaptive systems. Systems that absorb information from their environment and create stores of knowledge that can aid action are called "complex adaptive systems" (Mason, 2007; Fioretti and Visser, 2004). The concept of complex adaptive systems tries to explain how learning and innovation happen in living systems, and are used to describe "nonlinear systems" whose behavior is determined by the interaction of its adaptive parts (Price, 2004; Meek et al., 2007; Foster, 2005). The parts in complex adaptive systems are diverse in form and ability (Sherif, 2006). The system derives its complexity from the diversity of, and the level of interaction between the parts. The complexity of the system arises from the collective control that the parts exert on the whole. Thus, the higher the number of parts, the higher the level of interaction between them, and consequently the harder it is to predict the system's behavior (Amagoh, 2008).

While each part of a complex system acts according to its own best interest, collectively they cause the system to move in a certain direction, which may be hard to predict. Since there is no central control unit in a complex system, it is difficult to determine the attribution of any one part to the performance of the whole because of the confounding effect of a change in one part on other parts and the whole (Mason, 2007). The parts are constantly seeking to improve performance by driving the system away from equilibrium (Sherif, 2006). Over time, the extensive interaction between the parts determines the behavior of the overall system within its environment. The parts learn from these interactions and restructure themselves to better adapt to the environment (Styhre, 2002; Montouri, 2000).

Characteristics of Complex Systems

Complex systems have a number of common characteristics.

(i)   The presence of a large number of interacting elements within the system. The elements interact with one another, and such interactions are typically associated with the presence of feedback mechanisms in the system. The interactions in turn produce non-linearities in the dynamics of the system (Sherif, 2006; Price, 2004).

(ii)   Complex systems are dissipative structures, that is, a semi-stable configuration that does not correspond to external pressures and manipulations in a linear manner (Styhre, 2002; White, 2000). Dissipative structures operate in accordance with non-linear logic (Rhee, 2000; McElroy, 2000). A dissipative structure can, for instance, absorb a significant external pressure in certain positions, yet can be significantly altered by only minor influences in other positions (Fioretti and Visser, 2004; Meek *et al*., 2007). The organization is pushed further away from equilibrium and the situation moves towards the crisis stage. This causes some disorder (instability) within the organization. At the crisis stage, the organization's structure holds the organization together and dissipates the "fluxes of energy" coming into it (Mason, 2007).

(iii)   Complex systems have the ability for self-organization and adaptation. Parts of the system can self-organize rather than being imposed upon by centralized control (Sherif, 2006; Price, 2004; Styhre, 2002). Self-organization happens as the various decentralized parts of the system interact. Adaptation refers to behaviors which allow the system to survive changes in its environment. It is a response to changes that may reduce the efficiency of the system's behavior. Adaptation means the overall responsive behaviors of a system to changes in its environment (Byeon, 2005). It denotes the ability of a system to modify itself or its environment in response to environmental disturbances that threaten the system's efficiency. Adaptation often occurs when the organization is redirecting its internal processes in order to become more competitive (Montuori, 2000; Fioretti and Visser, 2004). Usually, adaptive behavior occurs where there is enough stability to sustain existence and enough turbulence for creativity to overcome inertia (Mason, 2007; Paraskevas, 2006; Meek *et al*., 2007). Continuous self-organization and adaptation allow and encourage a number of creative responses to emerge from changing environments (Steele, 2003). In complex systems, feedback loops are one of the major elements that make self-organizing systems effective (Rhee, 2000; McKenzies and James, 2004).

(iv)   Complex systems tend to exhibit emergent properties. This means that patterns emerge which are due to the collective behavior of the components of the system. (Ferlie, 2007) The emergent properties are independently observable and empirically verifiable patterns (Meek *et al*., 2007). Emergence happens after the system's parameters change, and the system is heading towards disorder. The ensuing crisis draws the organization in a particular direction (Pascale *et al*., 2000), and triggers behavioral changes in the organization. This is the stage where the organization reaches the threshold of "bifurcation" or a "phase transition" (Paraskevas, 2006; Sullivan, 2004). At this stage, the system may either break down leading to the demise of the organization, or break through to one of several new states which will emerge from the self-organization of the organization's components (Kaufman, 1993). The organization begins to display new "emergent" properties whereby its components take on new behaviors that none of them had before (McElroy, 2000). The experience of the organization from the crisis will become part of its organizational learning and will influence its behaviors in the future (Paraskevas, 2006; Ferlie, 2007).

Implications of Systems and Complexity Theories for Organizations

Systems and complexity theories are theories of organizational change that have implications for organizations. Organizations are dynamic systems of adaptation and evolution that contain multiple parts, which interact with one another and the environment.

The ability of organizations to change rapidly in response to intra and inter relationships is at the heart of an adaptive organization (Morel and Ramanujam, 1999).

The external environment is generally beyond the control of any organization and comprises the competition, the economy, social-cultural-demographic factors, political, legal- governmental aspects, technology, and the natural environment (Beeson and Davis, 2000). Since organizations are complex systems, an implication is that the organization is able to learn from its environment and change its internal structure and its functioning over time, thus changing the behavior of individual elements (Sherif, 2006; Paraskevas 2006). These changes in environmental factors can lead to turbulence in the organization in response to rapid, unexpected change in the environmental (Mason, 2007; Styhre, 2002). Growth in environmental turbulence can be the result of a reduction of orderly competition, an increasing need for information, innovation, quicker cycles of development, and more difficulty in predicting customer, product and service requirements (Beeson and Davis, 2000; Rhee, 2000; Montuori, 2000).

An understanding of systems and complexity theories provides an enhanced appreciation of how each of the sub-systems of the organization interconnects and interacts, and the nature of the interplay between the various components. Such an understanding can help organizational leaders plan how to better obtain resources such as raw materials and information, transform resources by making use of the social and technological components, and produce the best results (Yoon and Kuchinke, 2005).

A basic tenet of organization theory is that an organization's information processing capacity should be tailored to the information processing requirements of its environment (Fioretti, and Visset, 2004). This is not the case when an organization views its environment as complex. Since the complexity theory views organization change as comprising a complex, integrated, socially embedded and socially dependent process affected by a variety of causes and concepts (Sullivan, 2004; Paraskevas, 2006), managers aware of complex interactions are in a better position to understand the dynamics and behavior of an organization, and to guide strategy development (Mason, 2007).

Both systems theory and complexity theory form the basis of two organization change approaches that can be valuable in explaining the behavior of organizations in coping with a continuous change (Foster, 2005; Sullivan, 2004; Sherif, 2006). They provide a conceptual foundation that can help in prioritizing system performance levels and examining how they proactively and collectively seek to solve and adapt solutions (Styhre, 2002; Price, 2004). This implies that changes are produced on the basis of several interconnected causes and effects. An understanding of the complexity and systems paradigms makes organizational behavior subject to surprises and hard to predict, thereby making the attainment of organizational effectiveness non-obvious (Fioretti and Visser, 2004). As a result, decision-makers are more conscious of the limits of their knowledge and abilities. This allows organizational leaders to engage in a learning process with the complex system they are facing. Complexity theory has been utilized in studies of organizational transformation, corporate strategy, organization culture, and organization design, to mention but a few (Styhre, 2002; Yoon and Kuchinke, 2005:; Mason, 2007; White, 2000).

Conclusion

The basic premise of complexity theory is that there is a hidden order to the behavior, environment (and evolution) of complex systems. By using theories of organizational change, this paper attempts to describe the complex, dynamic, unpredictable and sometimes chaotic process of organizational transformation. Organizational change activities can be successfully examined from complexity and systems theories framework. The organizational change paradigms discussed in the paper suggest that changes are produced on the basis of a number of interconnected causes and effects whose relationships are complicated to conceive of from an analytical framework based on linearity. Systems and complexity models can offer more promising avenues from which organizational leaders can appreciate and address complex organizational dilemmas. Understanding these models and the environment of business could assist an organizational leader in creating organizational change structure with a view to modifying corporate culture to suit that of a learning organization.

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