From the Old Paradigm to the Complexity Paradigm: The Evolution of Organization Theory

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Abstract

Organization theory offer services to organization practice, the development of productivity promotes the evolution of organization theory. Under the old paradigm, the evolution of organization theory can be divided into three stages: classical organization theory, neoclassical organization theory and modern organization theory according to the different methodological approaches: the perspective of human-machine relationship, the perspective of human-human relationship, and the perspective of human-environment relationship. With the increasing complex of the organizational environments, the new complexity paradigm with nonlinear behaviors has replaced the old one, and is becoming the main current paradigm of contemporary organization theory. On paradigm and methodology, the two different layers of organization science, we can more clearly understand the evolution of organization theory and the outlook for the future development trend.

Keywords: Organization Theory, Evolution, the Old Paradigm, the Complexity Paradigm

1. Introduction

Organization theory comes from practice and the evolution of it depends on the evolution of organization practice [1]. The development of productivity drives the development of organization theory. As environments have become more complex, organizations appear to be flat-structure, class-stratified, network relationship, flexible and fuzzy boundary. The paradigm of organization theory has developed to the complexity one. This paper will make a research on the organization theory evolution from methodological approach and paradigm, which are two different layers of organization science.

2. Organization and organization theory

An organization is a universal phenomenon in human social. The division of labor is the foundation of organizations, but also the reason [2]. An organization exists when people interact with one another to perform essential [3], it is a social unit of people with recognizable boundary to meet a certain goal [4]. It is a unity composed of mental activities of member with same goals and technology, and operates in a certain relationship mode [5].

Organization theory is a series of academic viewpoints which attempts to explain the multiplicities of organizational structure and operating process [6], is a knowledge system which researches and explains organizational structure, function and operation, and organizational group’s behavior and individual behavior [7].

Because of how to enhance the productivity is the original object, industry organizations or business organizations are the main objects in the early studies. After Marshall firstly pointed out that an organization is one of factors of production, just like land, labor and capital, industry organizations have been seen as black-boxes to earn the maximum profit in neoclassical economics. They were regarded as the production functions corresponding to consumers which regarded as the utility functions at the same time. As an independent research system, organization theory emerged not long after World War II, in New York Columbia University and Carnegie Institute of Pittsburgh almost simultaneously. From 1970s and then, it developed rapidly after the intervention of social science [6]. For the reasons of the interventions of different perspectives from ecology, systems theory, complexity science, research ideas of organization theory became more widely. More branches of organization theory emerge, including organizational sociology, organizational management, organizational
economics, organizational behavior, organizational ecology, organizational politics and so on, they constitute the Jungle of organization theory.

Complete organization science should include 4 layers: philosophy, methodology, theory and application [8], and organization theory is the third layer, under the direction of methodology, it builds different management theories, management methods and management techniques by management practices. The relationship of them shows as the following figure:

![Figure 1. The layers of organization science](image)

Thomas Kuhn [9] built new perspectives on scientific revolutions and paradigms. A paradigm is a pattern obeyed by scientists when they engage in puzzle-solving activities in the normal science period. A paradigm is an accepted model or pattern, is an uncontroversial basic premise. The path of scientific development follows the model like: normal science $\rightarrow$ science crisis $\rightarrow$ scientific revolution. Scientific discovery is a cause for paradigms shifting but also the result, when the anomalies which cannot be explained under the old paradigm accumulate to a certain degree, it would lead to the science crisis, and then the new scientific theories will emerge.

Paradigms are on the philosophy layer of organization science. Even under the same paradigm, organization theory could be divided into different developing stages according to different methodological approaches. In the following content, I will make a summary of the related literature basing on the two main lines: paradigms and methodological approaches.

3. The development of organization theory under the old paradigm

3.1. The perspective of human-machine relationship: classical organization theory

Classical organization theory emerges in the early twentieth Century with the vigorous development of industry. Taylor, Fayol and Webb established the building and the development skeleton of classical organization theory, by defining respectively objects to research: individual efficiency, enterprise organizational efficiency and social organizational efficiency [10].

Taylor [1] hoped to replace the arbitrary managers with scientific and rational procedures, he advocated a bottom-up rational method of management, which affect working relationships by changing the way of completion of the individual tasks. The administration theory of Fayol diffused in the same period of scientific management theory. It adopted a top-bottom rational method of
management. Weber and Taylor, Fayol owned the same time background but the former had the different ideas. Weber regarded authorities as the core concept of administrative systems. After the researches on the three sorts of authorities, including traditional, legal and charismatic, Weber found that the legal one could keep the enduring bureaucratic structure since its structure has the pure technology superiority than other forms. At the same time, the bureaucratic structure is better at dealing complex administrative affairs than the traditional ones [11].

Structures are seen as the basic vehicles for organizations to achieve the bounded rationality. In classical organization theory, the rationalization of organizational structure is the core object. Organizational issues are researched on static-structure-legal perspective, and the core is the rationalization. Classical organization theory emphasizes the organizational features are impersonal and rational; focuses on the organizational structure designing, the basic principle and the basic management function of organizations [12]. The classical organization theory is the typical management philosophy in the perspective of Human-Machine relationship, which based on the hypothesis of ‘economic man’. Taylor and Webb regarded the organizational metaphor as machine, and the metaphor of members of organizations as ‘gear’ and ‘screw’. People lost their humanity in society, into a machine, and lost initiative in the work [14].

3.2. The perspective of human-human relationship: neoclassical organization theory

As the further improvement of labor productivity and the raising education level, the overly strict regulations and mechanical organization models which are built under the guidance of non-personification management rules in the classical organization theory lead to two results: the communications in organization are easily misinterpreted and organizational conflicts become more frequently. It brings new requirement to pay more attention to the factor of human in the management [14]. Elton Mayo showed that societies were the basic force to decide organizational operation through Hawthorne experiments. And then, he put forward the hypothesis of social man. At the same time, the results of Hawthorne experiments certify the importance of the informal organization on the organizational structural level [15]. It directly inspired the new research fields of organization theory to pay more attention to the factor of human, except for Mayo’s Human Relations Theory, the main schools include Maslow’s Hierarchy of Needs, Herzberg’s Motivator-Hygiene Theory, Mcgregor’s Theory X and Theory Y.

During the period of neoclassical organization theory, psychology, sociology and other disciplines theories were integrated into the organizational researches in order to explore human natures. In the early twentieth century, because of the development of productivity and the promotion of scientific management ideas, industry organizations have entered a machine age. But just like the piteous man whom played by Charlie Chaplin in the movie Modern Times, human was seen as partly of a machine. It was criticized and corrected by the scholars who focused on the behavioral science.

The pure perspective of human-machine relationship in classical organization theory limits the freedom of people and stifles the creativity of people in production activities. In neoclassical organization theory, the perspective of human-human relationship makes up these deficiencies, the humanized, dynamic, functional, psychological researches replace the mechanical, static, structural and physiological researches in classical organization theory [16], but it does not overthrow the latter, but develops it in succession.

3.3. The perspective of human-environment relationship: modern organization theory

In the middle of the twentieth Century, the third technological revolution promoted the rapidly development of economics and social, a series of new economic phenomena emerged. Organizational environments sustained and dynamic change, the classical and neoclassical organization theory, emphasizing reasons and regarding organizations as closed systems, have been unable to adapt to these changes. The organizational practices require the significant transformation of organization theory, it catalyzes the modern organization theory.

The study on organizational environments attracted more attention of scholars, and the emergence and development of contingency theory pushed the organization theory into the mainstream. As a branch of the system design ideas, contingency theory emphasizes the decisions of organization design depends on environmental conditions and is the result of the environment’s trade-offs [15]. Lawrence
and Lorsch[17] argued that an organization was influenced by environments, and was a subsystem of the social open systems; an organization couldn’t be viewed in isolation but studied in the particular environment of it. Although the contingency theory could not be proved through strict mathematical model because of its dynamic nature, that led to itself could not deeply be into the mainstream [6], but its focus on the environments and the open systems perspectives bring research of organization theory into the era of the perspective of Human-Environment relationship.

The environments of organization consist of two dimensions and three elements, including the dimensions of institutional environment and technical environment, as well as the elements of control, standard and cultural-cognitive[15]. In order to analyze the effect of the environments on organizations, Scott and Davies [15] divided organizational researches into three layers, they are organizational set, organizational groups and organizational field. Firstly they observed the environments on the sub-layer of organizational set from organization perspective; and then they analyzed the group's behaviors, competition strategy and the choice function of the environments on organizational group layer; at last, the analysis objects on the sub-layer of organizational filed improve the organization associated with the other ones which sharing the same technologies, standard orders, laws and regulation systems [18].

The institutional environment has a profound effect on organizational behaviors, Scott emphasized that organizations worked in the institutional environment, while all exchanges were in the market, which was a complexity system consisted of principles and practices of the institutions. The response strategies of organizations for institutional environment mainly include acquiescence, compromise, avoidance, resistance and even control. DiMaggio and Powell [19] equated the government and professionals with the agents of institution and they played the roles on the organizational field layer, the organizations in the same organizational field would be homogeneous because of the effect from forces, imitations and standards.

The interactions and influences between environments and organizations are two-way, environments and organizations influence each other: Scott described the environmental impact on organizational structure by ‘the relationship between organizations and environments: interdependent cycle’ model, and pointed out that the structure was the common result by the organizational operations and the environmental responses. For North [20], institutions will limit behaviors between the relationship of them, and organizations will use the chances which come from institutions to improve the economics; the establishments of institutions determine the range of opportunities and cost, organizations will effort to reduce the cost and even try to alter the institutions by changing the negotiation forces.

In summary, the important characteristic of the modern organization theory is the open-system perspective, the focus of the environments effecting on organizations and organizational responses to environments. Compared with the perspective of Human-Machine relationship in classical organization theory and the perspective of human-human relationship in neoclassical organization theory, the modern organization theory enters the age of the perspective of human-machine relationship, and it extents the views of study on organization from the point of individual, local rules to the systemic research and organizational relationship with its environments. But the modern organization theory and the former two are based on the paradigm which at the basis of Newton-classical mechanics, they still use the linear assumption and reductionism as their notional and research’s framework, follow the ‘strong causality principle’ described by Laplace’s Determinism. They study the organizational part or whole behaviors through simplifying and resolving the real organizational systems. This paradigm is adapted to the productivity level in times, has also made a very great achievement, and has built the mainstream structure of organization design with hierarchical feature, emphasizing the divisions of labor and specialization, achieving a static solution. However, as the development of science, technology and the productive forces, the mankind has entered the information age that innovations of the knowledge are the impellent powers of social development. With new features of the new era becoming increasingly convenient, personalized, diversified, heterogeneity and decentralized, the governance of traditional bureaucracy organizations become gradual fragmentation [21]. As more and more puzzles of organizational issues cannot be answered under the old paradigm, Kuhnian Anomaly emergences, it calls for the contemporary organization theory which main character is the complexity paradigm.
4. The development of contemporary organization theory under the complexity paradigm

4.1. Complexity science

Due to the range of complexity science covers almost all fields, its meaning includes computational complexity, compositional complexity, structural complexity and functional complexity [22], we cannot define it by a simple concept, it calls the complex of the concept of complexity [23].

The edge of chaos is one of the definitions of complexity, and it equates the complexity in the dynamical system which was divided into order→complexity→chaos [24]. For Warfield [25], the concept of complexity depends on how we treat it, it includes two kinds of meanings: situational complexity and cognitive complexity. And the word of complexity means the complex combination consisted by the former two (i.e., interaction).

Complexity science is a change of thinking pattern on classical science which is established on the base of order, segmentation and reason. It is a completely new view of the world. Complexity thinking pattern is achieving to establish the connection in three concepts: order, disorder and organization; promotes the exchanges and fusions between indivisibility and divisibility; does not blindly to establish the logic of absolute rationality based on the inductive method, deductive method and the law of identity, only is used in the ideological segment [23].

Nonlinear behavior as the core characteristic of complexity corresponds to the linear feature of the traditional paradigm. In addition, the multi-connectivity, fractal, non-centralized controllability, instability, chaos, emergence, self-organization, differentiation, diversification and evolutionary abilities are the characteristics of complexity discribed by Encyclopaedia Britannica.

4.2. The complexity paradigm and the principles

Edgar Morin is one of the early scholars who define the paradigm and the principles of complexity. He defines the complexity paradigm as the principles which can decide to understand about the (physical, biological, human-social) complex world’s concepts [20], and he has summarized thirteen principles of complexity paradigm. Huang [26] argues that Morin’s principles of complexity paradigm can be summarized in six mainly ones: nonlinear, integrity, autonomy, relevance, emergence and multiplicity, and the nonlinear behavior is the core characteristic which the remaining ones can be deduced from.(see Figure 2).

4.3. The organization theory under the complexity paradigm

The complexity science has become a broad-ranging subject after it exhibits. For the reasons of the pressure from managers for new methods and the passion with which management consultants put untested organization science ideas into instant practice, management practice is especially susceptible to fads; at the same time, the complexity theory is being applied in physics and life science which can...
be seen as the organizational environment, all the above improves the applications of complexity science into organization theory [27].

In organization theory, complexity has been treated as a structural variable to describe the characteristics of organizations and its environments, or as synonyms of variability, uncertainty, unpredictability and non-cognitive [28].

4.3.1. Complexity system and complex adaptive system: The study of the organizational complexity is often associated with the study of complex systems, and about what is a complexity system, as the concept of complexity, there is not a strict definition. After the conclusion of the current seven kinds of the definitions of systems, Liu [29] defines a complexity system as the big system which is consists of lots intelligent, self-adaptive agents. There is not the central control inside it but a lot of complexities which lead to huge changes, and determine complex interactions between the system and environments. A complexity system can show the whole behaviors (characteristics) which cannot show on part, that is emergence.

From adaptation, the other side of complexity, Holland [30] studied on complexity systems. A new research field emerged, and it was named by Santa Fe Institute (SFI) as ‘complex adaptive systems’ (CAS). Holland [30] described CAS as systems consist of interactional agents which behaviors could be dictated by the schema. Each agent could adapt to its environments by striving to increase a payoff or fitness function over time, this is the main reason for CAS to be dynamical systems. CAS are seen as a truly new way of simplifying the complex. They can be characterized by four key elements: agents with schemata, self-organizing networks sustained by importing energy, coevolution to the edge of chaos, and system evolution based on recombination [28].

4.3.2. The complexity of organizations: There is a lot of literature on the complexity of organization, this essay will summarize them on the perspective of self-organization and the perspective of network.

Theory of self-organization is one of the first perspectives on complexity research in the research field of organization. There is one view that the new paradigm of organization theory originated from Drucker’s article New Organization published in Harvard Business Review in 1988. In this article, the new organizational paradigm which emphasized knowledge based and essentially self-conduction is the paradigm of self-organization but not the traditional paradigm of to-be-organized [31]. For Haken (1988), the concept of self-organization means there is no external specific intervention on the process of system’s structure designed. Under the new paradigm of organization theory, a organization is the process of organization, and this process can be divided into two kinds: self-organization and to-be-organized. A self-organization can be defined as a process that all elements organize themselves through their own initiative to systematization or ordering, it means that a self-organizational system can organize, create, evolve, innovate and develop without external instruction, it is a continuous process from disorder to order [31].

In the self-organization theoretical system, the dissipative structure theory profoundly reveals the self-organizational evolution forms of systems and the development process; the catastrophe theory focuses on the analysis of the pattern of the system’s self-organizational evolution from local to the whole; chaotic dynamics and fractal theory describe complexity of the time, spatial structure and characteristics in the system’s self-organizational process. These theories form the leading-edge natural science, which researches the complex system’s self-organizational evolution.

From the perspective of network organization, Cheng [32] summarized the performances of the complexity of systems as the network behaviors among the units of systems, multilevel and multifunction of structure of systems, the reorganization of the level and the functional structure during development process of the systems, the dynamic characteristics and the changing abilities to adaptive the future development. On the view of organizational evolution, Snow and Miles [33] regarded network organizations as the fourth new organizational form, after functional organization, divisional organization and matrix organization.

In summary, because of the influence from technical environments and institution environments, the forms of contemporary organizations appear the characteristics of flat, network and flexibility. The relationships of organization-organization and organization-environment become more and more complex. On the study of complexity organizations, contemporary organizational scholars regard complexity organizations as complexity systems, or equal them to CAS from the perspective of open and system. The scholars pay more attentions to the characters of complexity organizations: nonlinear
behaviors, self-organization and so on. Undoubtedly, CAS are a truly effective way of simplifying and analyzing the complex, but it is conditional that complexity systems are regarded as CAS. They must fit seven basic points what were described by Holland [30], including four characteristics: aggregation, nonlinear, flows and multiplicity; and three mechanisms: tagging, internal model, and blocks. The origin of complexity of CAS is the interaction mechanism between agents, and the order just is the result of emergence. Therefore, a network organization just is a form of complex organizations, and a self-organization just is one of the most important characteristic of complex organizations. In the researches of complex organizations, the causes of complexity and working mechanisms of agents are prior. The characteristics of self-organization and emergence are studied on the base of aggregation and fractal.

5. Conclusion

The development of productivity leads to the changes of the organizational environments and organizational practices, it is the important impetus of the development of organization theory. Through the two lines of scientific paradigm and methodology, basing on the literature review, the evolution of organization theory is studied in this paper in detail. Under the old paradigm with nonlinear characteristic, the developing process of the methodology of organization theory is from human-machine relationship perspective, human-human relationship perspective to human-environment relationship perspective. Basing on that, the organization theory under the old paradigm could be divided into three stages: classical organization theory, neo-classicism organization theory and modern organization theory. They have built the mainstream structure of organization design with hierarchical feature, emphasizing the divisions of labor and specialization, achieving a static solution. Today, the mankind has entered the information age that innovations of the knowledge are the impellent powers of social development. As organizations and their environments have become more and more complex, the complexity paradigm with nonlinear behavior has substituted the old one, and it has become the mainstream paradigm in the research field of organization theory. With the continuous development of science and technology, the complex standard of future organizations and their environments will be higher and higher. It can be predicted that organization theory will continue to develop under the complexity paradigm.

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7. References
