

Title	Complex problem solving : HeXie Management Theory from China
Author(s)	XI, You-min; ZENG, Xian-ju
Citation	
Issue Date	2005-11
Type	Conference Paper
Text version	publisher
URL	<a href="http://hdl.handle.net/10119/3894">http://hdl.handle.net/10119/3894</a>
Rights	2005 JAIST Press
Description	The original publication is available at JAIST Press <a href="http://www.jaist.ac.jp/library/jaist-press/index.html">http://www.jaist.ac.jp/library/jaist-press/index.html</a> , IFSR 2005 : Proceedings of the First World Congress of the International Federation for Systems Research : The New Roles of Systems Sciences For a Knowledge-based Society : Nov. 14-17, 2104, Kobe, Japan, Symposium 4, Session 3 : Meta-synthesis and Complex Systems Methodology and Applications



# Complex problem solving: HeXie Management Theory from China

XI You-min<sup>1</sup>, ZENG Xian-ju<sup>1</sup>

<sup>1</sup>School of Management, Xi'an Jiaotong University, P. R. China, 710049

[vmxi@mail.xjtu.edu.cn](mailto:vmxi@mail.xjtu.edu.cn)

[xjzeng@mail.xjtu.edu.cn](mailto:xjzeng@mail.xjtu.edu.cn)

## ABSTRACT

With the development of management practice and establishment of epistemology of complexity science, traditional management theories are facing a lot of challenges and dilemmas when they try to explain the world and guide the practice. It is one of the most important questions for management theory researchers and practitioners that how to resolve and utilize the uncertainty of human and realize the optimization of object simultaneously. Based on a systemic and brief revisit to the history of management in last century, HeXie management theory, which fully absorbs the harmony thought of Chinese traditional culture and the latest development of management researches, is introduced systematically in this paper. HeXie management theory has been formed relative complete theoretical framework after research and development continuously for more than a decade, and it is trying to build a Management Model which has a new understanding on the organization management with Chinese characteristic. This paper focuses on discussing the mechanism of HeXie coupling. It is HeXie Coupling that helps inducement evolution and rational design realize the dynamic coherence of organization as a whole.

**Key words:** HeXie management theory, Complexity, Coupling mechanism, system, Order.

## 1. Introduction

Can people really find a way of keeping harmony between realization of economic benefit and human's development in all-round way, mankind and nature, science and society, global economic integration and cultural diversity? This is a crucial issue for managers in the world that is full of uncertainty and complexity. After all, the history of human beings clearly realizing the end of certainty time <sup>[1]</sup>, exploring complexity <sup>[2]</sup> and thinking in complexity <sup>[3]</sup> is not too long. In this sense,

HeXie management theory <sup>[4-20]</sup>, which fully absorbs the harmony thought of Chinese traditional culture and the latest development of management researches, is trying to build a new Management Model which has a fire-new understanding on the organization management.

## 2. Facing complexity: HeXie management theory

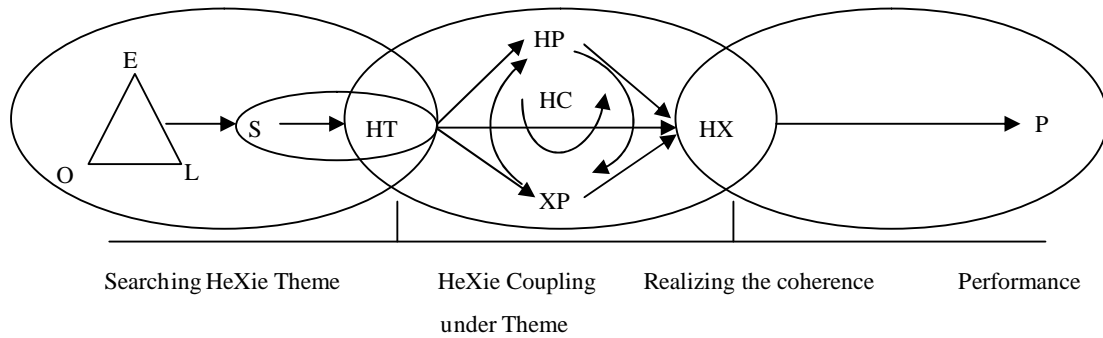
### 2.1 Systematic rethinking on management study

There is no doubt that management theory jungles <sup>[21-23]</sup> have presented the instructive guidance from their own individual views for the management practice and have greatly enriched and promoted the research on the management theory. Xi and Han <sup>[9]</sup> give a systematic rethinking on management and relevant issues based on a brief revisit to the history of management in last century. There are three measures of developing management, namely method-optimization, action-perception and interactive order of human/object. In the view of the new management system thinking, the management research should primarily focus on the optimization of objects, the understanding of human and the order of interaction between human and object. Therefore, it is one of the most important questions for management researchers that how to resolve the uncertainty of human and realize the optimization of object simultaneously.

### 2.2 A new management model: HeXie management theory

HeXie management theory is proposed and further researches are undergoing <sup>[4-20]</sup>. A relative complete theoretical framework is established as showed in Fig. 1.

In brief, the main thought of HeXie management theory is that managers can use the ways of optimization and resolve uncertainty under HeXie Theme to reach the goal of organization. We define the HeXie Theme (HT) as the key task or problem guided by strategy of organization in some period.



**Fig. 1 The framework of HeXie management theory**

To search HeXie Theme should consider the three factors, namely environment (E), organization (O) and leadership (L), and also guided by strategy (S). After HeXie Theme is selected, Xie Principle (XP) focuses on scientific design and optimization under relatively certain conditions, while He Principle (HP) is used to inspire the creativity of individuals to resolve uncertainty. HeXie Coupling (HC) shows the order of interaction between He Principle and Xie Principle under HeXie Theme in different levels. Xie Principle performs management tasks by presenting specific behavioral path in advance in the sense of cost-benefit analysis. He Principle can inspire the positivity and creativity of individuals to adapt the environment's change and accomplish those tasks which cannot be regulated in advance effectively. The coupling of He Principle and Xie Principle under the HeXie Theme helps to realize organization dynamic coherence, which is named the realization of harmonious organization. Actually, HeXie Coupling process is dynamic and evolutive process with spiral promotion. So in the views of the new management system, HeXie Coupling under the HeXie Theme is considered as the spirit of the management. She shows the organic combination of the scientific and artistic characteristic of management well.

**3. Complex problem solving: mechanism and model of HeXie coupling**

**3.1 Insight on organization: the perspective of complexity study**

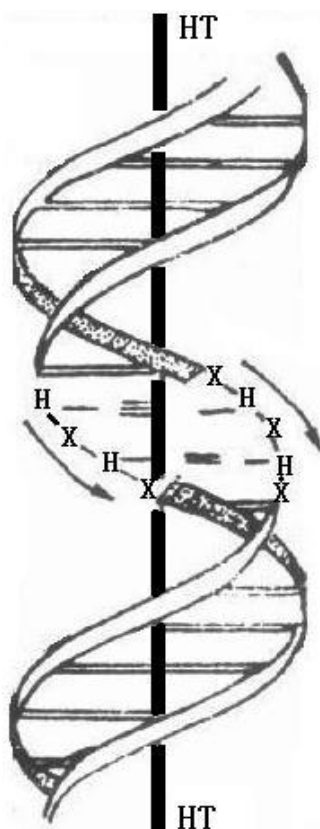
Organization theory has treated complexity as a structural variable that characterizes both organizations and their environments [24-26]. As P. Anderson said: "Many modern organizations are complex adaptive systems par excellence" [27]. Santa Fe Institute (SFI) which was sponsored by K. Arrow, M. Gell-Mann and P. Anderson has taken the organization management as its important research field and SFI has played important role in understanding the management problems from the perspective of complexity [28]. Stacey [29] and Levinthal [30] believed that it is better to understand the complexity of organization if we regard the organization as complex adaptive system [31-33]. In China, Qian, Xuesen [34] has defined the concept of open complex giant systems and pointed out that complexity is dynamics of complex giant systems, which clearly indicated the relations between the complexity science and system science.

Management system can be considered as a complex system or complex network. A typical example is that the firm is regarded as the system which is composed of a series of the closely related and interactional factors [35-37]. In this sense, it is urgent for the management researchers and practitioners to explore the coupling mechanism of complex system.

Therefore, one of our tasks is to seize the promise of complexity theory, rather than make it a fad<sup>[38]</sup>.

### 3.2 The double helix model of HeXie Coupling

Actually, He Principle and Xie Principle are a uniform body among which the two parts interact. The reason why we separate them and introduce the two different principle systems is that, on the one hand, we should follow the requirements for analyzing them when constructing the theory framework; on the other hand, it is natural for us to have this idea when we clarify the uncertainty and certainty which are the fundamental idea of world view. The Fig. 2 shows us the dynamic and evolutive process with spiral promotion.



**Fig. 2 The double helix model of HeXie Coupling**

The model points out that HeXie Coupling is a dynamic and evolving process, during

which He Principle and Xie Principle under HeXie Theme adjust to each other at the different level of the organizational network. It is HeXie Coupling that helps inducement evolution and rational design realize the dynamic coherence of organization as a whole. HeXie coupling should follow three rules. Firstly, He Principle and Xie Principle that directed by the HeXie Theme should interact and fit rather than separate each other. Secondly, the problems which should be solved by He Principle originally can be solved by Xie Principle when manager know the law of causation, and He Principle should find new ways to solve the problems caused by people's activity and creativity in the process of using Xie Principle, that is, He Principle and Xie Principle can convert each other under some condition. Thirdly, the mechanism of HeXie coupling is characterized by "adaptive walk" among local optimality and global optimality, and complexity to be worthy of being taken into account emerge from the coupling.

Under given conditions, the management activity is the practice with maneuverability, that is, the management activity is constrained by the cost. It is not to pursue the scientific and ideal state infinitely. Even if we can make the rational design and control on some activities in theory, we prefer to provide individual with the space and conditions to let them make free choices rather than rational design because human behavior has the characteristic of uncertainty and creativity to the guidance of relevant environment. Under the guidance of the new epistemology, if we regard He Principle and Xie Principle, inducement evolution and rational design as two legs of the humane being, HeXie management theory advocates walking by two legs. The key of HeXie Coupling is aiming to solve the problem that how to make the two legs congruously and orderly to walk with steadiness and sound speed. Manager should organically combine the two principles to attain the

coherence of the global organization and achieve better performance.

#### 4. Comparative analysis between HeXie Coupling and Systems Thinking

Facing such a great and complex change, Checkland [39-40] put forward soft system methodology (SSM) which is closely related with the management. M Jackson [41] brought forward the creative holism for managers. In Asia, Gu J F. [42-44] also put forward Wu-li Shi-li Ren-li (WSR) system approach based on the oriental system thinking and Sawaragi Y [45] created the Shinayakana system approach. The boundary of systems thinking is illegibility because of the nonlinear interaction of human and object and the complexity emerging from coupling, so that R. Flood [46] criticized that systems thinking seem to lack of practicality because they are most characterized with general applicability. HeXie management theory recognizes different laws existing in different systems, advocates using methodology of

dual-rules to solve complex management problems, and integrates Wu-li Shi-li Ren-li (WSR) with HeXie coupling under the HeXie Theme. It is main aim of international complex adaptive system (CAS) research at present, which involves in not only complexity research but also research on human cognition. The essential difference between HeXie management and traditional management theory is that HeXie management follows the dual rules and not attempts to use a principle of rational design to solve all management problems.

In terms of HeXie management theory and the research findings of brain science [47-55], Xi and Zeng [19] draws an analogy between the principle of brain function and HeXie coupling mechanism. Fig. 3 shows us the basic model of HeXie management and brain system in the process of solving the complex problems. The thought of HeXie Coupling includes strategy thinking in searching HeXie Theme (HT), program thinking in analyzing Xie Principle (XP), culture thinking in analyzing He Principle (HP), and system thinking in realizing HT by dual-rules.

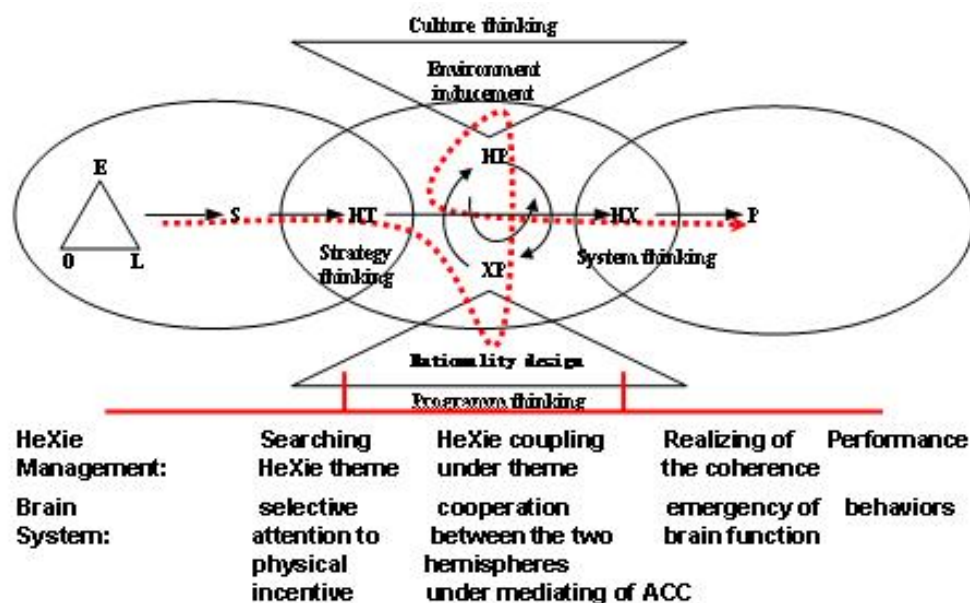


Fig. 3 Complex problem solving: Brain model of HeXie coupling

HeXie management theory that aims to enhance the issue-oriented management

knowledge, 1) focuses on complex structure and function in management action, attempts to

probe into the laws of dynamic evolution of management; 2) not only has characteristic of general system of knowledge, but also has particularity meet an emergency; 3) it should has rigorous logic, brief form and well ability of explain and forecast. Just as Prigogine had advocated that modern science should combine the west science tradition, which emphasizes experiments, analysis and description by quantity formula, with the Chinese traditional philosophy, which emphasizes harmony and cooperation in order to get a new synthesis. Absorbing these new knowledge and fruitful insights of them, HeXie management theory aims to fill in the gap between general applicability and localization of management.

## 5. Conclusion

By dual-rules of inducement evolution and rational design under HeXie theme, HeXie management theory is useful to diagnose whole management process and status, to improve on organizational performance, and to be free of embarrass of dazzling management fashion jungle. We have finished the case study involving the state-owned enterprises, collective enterprises, private enterprises and scientific research institutions and also published the research findings. HeXie management theory has been applied in many enterprises and institutions. Currently, we have launched a large-scale empirical research on approximate one thousand firms and about 200 questionnaires have been collected. We are devoted to build and propel the management model and management theory with Chinese characteristic.

## Acknowledgments

We would like to thank Mr. Jing Hui, Mr. Wu Jian-zu and Mr. Bi Yan-feng, for their helpful comments on an earlier version of this paper. Finally, funding, in part from of National Science Excellent Innovation Research Group Fund of China under contract No. 7012001, is gratefully acknowledged.

## References

- [1] Prigogine, I. The end of certainty time, Shanghai Scientific and Technological Education Publishing House, 1998. (in Chinese).
- [2] Nicolis, G. & Prigogine, I. Exploring complexity. Sichuan Education Press, 1986. (in Chinese)
- [3] Mainzer, Klaus. Thinking in complexity: the complexity dynamics of matter, mind and mankind. New York: Springer, 1997.
- [4] XI You-min. Harmony theory and strategy [D]. Xi'an Jiaotong University, 1987. (in Chinese)
- [5] XI You-min. Harmony theory and strategy. Guizhou people press, 1989. (in Chinese)
- [6] XI You-min, SHANG Yu-fan. Harmony management thought and contemporary harmony management theory, Journal of Xi'an Jiaotong University (Social Sciences), 2001, (3): 23-26. (in Chinese)
- [7] HUANG Dan, XI You-min. Harmony management: reinterpreting of harmony theory. Journal of Industrial Engineering/Engineering Management, 2001, (3): 69-72. (in Chinese)
- [8] LI Wu, XI You-min. Management control and harmony control. Journal of Industrial Engineering/Engineering Management, 2002, (2): 83-85. (in Chinese)
- [9] XI You-min, HAN Wei. Systematic rethinking on management. Journal of Management Sciences in China, 2002, (6): 1-8. (in Chinese)
- [10] XI You-min, HAN Wei, SHANG Yu-fan. Facing complexity: conceptions, principles and framework of HeXie Management Theory. Journal of Management Sciences in China, 2003, (4): 1-8. (in Chinese)

- [11] XI You-min, SHANG Yu-fan. Study on HeXie management thought and theory. IFSAM 2002 Conference, Gold Coast, Queensland, Australia.
- [12] XI You-min, SHANG Yu-fan. HeXie management theory. China Renmin Univeristy Press, 2002. (in Chinese)
- [13] XI You-min, YAO Xiao-tao. HeXie Management Theory and Business Strategy Analysis Framework under Highly Changing and Complex Environment. *Management Science in China*, 2003, (8). (in Chinese)
- [14] WANG Qi, XI You-min, SHANG Yu-fan. The core of HeXie management theory: reinterpreting of HeXie theme. *Management Review*, 2003, (9): 24-30. (in Chinese)
- [15] TANG Fang-cheng, MA Jun, XI You-min. The coupling mechanism and emergence of complexity in HeXie management. *Theory and Practice of Systems Engineering*, 2004, (11). (in Chinese)
- [16] XI You-min, WANG Hong-tao, TANG Fang-cheng. Management control and HeXie management research. *Chinese Journal of Management*, 2004, (1). (in Chinese)
- [17] XI You-min, XIAO Hong-wen, WANG Hong-tao. HeXie management theory and its new development in the principles. *Chinese Journal of Management*, 2005, (1). (in Chinese)
- [18] XI You-min, TANG Fang-cheng, GUO Shi-yi. HeXie theory. Xi'an Jiaotong University Press, 2004. (in Chinese)
- [19] XI You-min, ZENG Xian-ju, TANG Fang-cheng. Complex problem solving: brain model of HeXie coupling. Accepted by *Journal of Management Sciences in China*,
- [20] XI You-min, GE Jin, HAN Wei, CHEN Jian. The meaning and value of HeXie Management Theory. *Chinese Journal of Management*, 2005, (4). (in Chinese)
- [21] Koontz, Harold. The management theory jungle. *Academy of Management Journal*. 1961,4:174-188.
- [22] Koontz, Harold. The Management Theory Jungle Revisited. *Academy of Management Review*, 1980, 2:175-188.
- [23] Paula Phillips Carson, Patricia A Lanier, Kerry David Carson, Brandi N Guidry. Clearing a path through the management fashion jungle: Some preliminary trailblazing *Academy of Management Journal*. 2000, 6.
- [24] Daft. Richard L, *Organization Theory and Design*. (4th ed.) West Publishing, St Paul. MN, 1992.
- [25] Scott, W. Richard. *Organizations: Rational. Natural and Open Systems*. Prentice-Hall, Englewood Cliffs, NJ, 1992.
- [26] Galbraith, Jay R. *Designing Complex Organizations*. Addison-Wesley. Reading. MA, 1982.
- [27] Anderson, Philip. *Complexity Theory and Organization Science*. *Organization Science*, 1999,3:216-232.
- [28] Goldstein, Jeffrey. Emergence as a Construct: History and Issues. *Emergence*, 1999,1:49-72.
- [29] Stacey, Ralph D. The science of complexity: An alternative perspective for strategic change processes. *Strategic Management Journal*. 1995,6.
- [30] Levinthal, D. A. Adaptation on rugged landscapes. *Management Science*, 1997, 43: 934-950.
- [31] Holland. John H. 1995. *Hidden Order: How Adaptation Builds Complexity*. Addison-Wesley. Reading. MA.
- [32] Gell-Mann. Murray. *Complex adaptive systems*. George A. Cowan. David Pines. David Meltzer eds. *Complexity: Metaphors, Models and Reality*. Addison-Wesley, Reading, MA. 1994.
- [33] Boisot, Max; Child, John. *Organizations as Adaptive Systems in Complex Environments: The Case of China*. *Organization Science*. 1999,3:237-252.
- [34] X.S. Qian, J.Y. Yu and R.W. Dai, "A new

- discipline of science - the study of open complex giant systems and its methodology”, *Nature Magazine*, Vol.13, No.1, pp. 3-10, 1990. (in Chinese, an English translation is published in *Chinese Journal of Systems Engineering & Electronic*, Vol. 4, No. 2, pp. 2-12, 1993).
- [35] Milgrom.P.R & J.Roberts. The economics of modern manufacturing: Technology, strategy and organization. *American Economic Review*, 1990, 80: 511-528.
- [36] Porter,M.E. What is strategy?. *Harvard Business Review*, 1996, 74 (6): 61-78.
- [37] Whittington,R&A.Pettigrew, S.Peck, E.Fenton and M.Conyon. Change and complementarities in the new competitive landscape : a European panel study, 1992-1996. *Organization Science*, 1999,10: 583-600.
- [38] McKelvey, Bill. Complexity Theory in Organization Science: Seizing the Promise or Becoming a Fad? *Emergence*, 1999, 1:5-32.
- [39] Checkland, P. B. Soft systems methodology as process: A reply to M. C. Jackson. *Journal of Applied Systems Analysis*, 1982,9: 37-39.
- [40] Checkland, P. B. *Systems Thinking, Systems Practice* (new edn, including a 30-year retrospective). John Wiley & Sons, Chichester, UK. 1999.
- [41] Jackson, M. C. *Systems Thinking: Creative Holism for Managers*. China Renmin Univeristy Press, 2005. (in Chinese)
- [42] J.F. Gu and Z. Zhu, “The Wuli-Shili-Renli approach: An oriental systems methodology”, in *Systems Methodology I: Possibilities for Cross-Cultural Learning and Integration*, G.L. Midgley and J. Wiley (Eds.), University of Hull, UK, 1995:29-38.
- [43] Jifa Gu and Xijin Tang Wu-li Shi-li Ren-li System Approach to a Major Project on the Research of Meta-synthesis System Approach. *International Journal of Knowledge and Systems Sciences*, 2004,1:70-77.
- [44] J.F. Gu and F. Gao, “Monitoring evaluation and dissemination management idea Wuli-Shili-Renli system approach and their application”, in *Synergy Matters: Working with Systems in the 21st Century* (proceedings of the 6th UK Systems Society International Conference), A.M. Castell, et al. (Eds.), Kluwer Academic/Plenum Publishers, Hardbound, pp. 433-438, 1999.
- [45] Sawaragi Y, Naito M and Nakamori Y. Shinayakana Systems Approach in Environmental Management. In: *Proceedings of 11th World Congress on Automatic Control: Automatic Control in the Service of Mankind*, Tallinn, USSR, 1990, August 13~17. Pergamon Press, Vol.V: 511~5
- [46] Flood, Robert Louis. *Rethinking the fifth discipline: learning within the unknowable*. CITIC Publishing House, 2004. (in Chinese)
- [47] Vernon L.Smith. Costructivist and ecological rationality in economics. *American Economic Review*, June 2003: 465-508.
- [48] H.A.Simon. *Administrative behavior: a study of decision-making processes in adiministrative organizations*, 4th Edition The Free Press.1997.
- [49] Newell,A.&H.A.Simon. *Human problem solving*. Englewood Cliffs NJ: Prentice-Hall. 1972.
- [50] Henry. Mintzberg. Planning on the left side and managing on the right side. *Harvard Business Review*, July-August 1976: 49-58.
- [51] Henry, Mintzberg. *The new science of management decision* (Book). *Administrative Science Quarterly*, Jun77, Vol. 22 Issue 2: 342-351.
- [52] H.A.Simon. *Making management*



decisions: the role of intuition and emotion.  
Academy of Management Executive,  
Feb87, Vol. 1 Issue 1: 57-64.

- [53] Tang Xiao-wei. The Principles of Brain Function. Zhejiang University Press, 2003.  
(in Chinese)
- [54] Klaas E. Stephan, John C. Marshall, K. J. Friston, James B. Rowe, Afra Ritzl, Karl Zilles, Gereon R. Fink. Lateralized cognitive processes and lateralized task control in the human brain, Science, Vol 301, Issue 5631, 18 July 2003, 384-386.
- [55] R.W. Sperry. Hemispheric deconnection and unity in conscious awareness. Scientific American, 23, (1968): 723-733.