

Critical Issues for Organizational Growth and Success: A Systems Thinking View using Feedback Loop Analysis

Sumant Kumar Bishwas

Research Scholar,
Department of Management Studies,
Indian Institute of Technology Delhi
Email: skbiswas.iitd@gmail.com
C.N. - 011-2659-6435

Sushil

Professor
Department of Management Studies,
Indian Institute of Technology Delhi
Email: profsushil@gmail.com
C.N.-011-2659-1167

Abstract

In the current knowledge era, organizations are facing tough competition due to the highly uncertain environment. The technological development and change in organizational mindset from traditional resource and asset based to knowledge base thinking further acts as a catalyst for this kind of uncertainty. The future of the organization depends on the extent of organizational knowledge and its ability to use the knowledge for practical purpose. Learning, innovation, flexibility, change process are some of the critical issues which decide the competitiveness of the organization. This study focused on some of the critical issues for organizational long-term growth and success. The study is basically based on the caselets study of about 12 organizations which are discussed with a systems thinking view. Casual loop analysis has been done to summarize the caselets. An innovative idea of interpretive logic explanation of the links, has been done as add on to the casual loop methodology.

Keywords: change, learning, innovation, knowledge management, organization culture, top management support

Introduction

In the current fast changing scenario the biggest challenge before any organization is to become the organization of the future (Fuller, 1982). This requires considering the organization, system as a whole, incorporating various subsystems within it. Being good in one or two subsystems like developing a new market product, implementing a new strategy or having a technical break through is not sufficient to gain the objective. According to Reissner (2005), some of the important issues for long-term success and to remain vital are focusing on customer, profitability, flexibility and commitment and a clear well defined information policy.

Organization can be defined as a system composed of different kind of sub-systems. The concept of systems thinking put more emphasis on the organizational system as a whole (rather than a specific part) and the interrelationship among its parts (Ackoff, 1994).

Systems dynamics has contributed in a great way to understand the organization management considering organization as a system. System dynamics concept was evolved with the work done by Jay Forrester (1968) at MIT in the 1950s to understand the behavior in the organization. It deals with the changes happens in behavior of the system with respect to time and helps in grasping the knowledge about the surrounding environment. In Richmond (2001) view one of the most powerful aspects of this concept is that it can incorporate the variables (named as soft variables) which are very rarely shown on financial data but recognized as important one for complete understanding of the organization.

In the early stage the concept of system dynamics focus was mostly on the mathematical modeling and on the use of positivist/objective approaches. This initial paradigm was known as “hard system dynamics”. With respect to time, the inclusion of other system thinking concepts gradually shifts the paradigm from hard to soft system dynamics. These attempts moved system dynamics from the hard concept to a much softer paradigm (Forrester, 1992). The latest concept of system dynamics has moved from traditional beginnings to the newer approaches that are related to interpretative and learning paradigms (Forrester, 2007). Model building with stock and flow diagrams or (and) causal loop diagrams, and simulation, is considered as the core of this concepts.

Thompson and Cavaleri (2010) examined the effect of system dynamics on environmental and organizational issues. According to the authors, system dynamics can be used to improve quality of organizational knowledge. This methodology can be used as a framework for inquiry and action research and to understand the complex organizational problems. Using systems dynamics, Thompson and Cavaleri (2010) have further proposed a tool for knowledge management with the objective of developing learning process in organization concerning the issue of sustainability.

It is widely accepted that knowledge is critical for success of the organization. The accumulated knowledge of customers, innovations, processes, and human resources need to be integrated for critical decision making process (Shang *et al.*, 2008). In today’s changing environment, intellectual capital should be managed using some dynamic method. Continuous integration, modification and innovation capability is the basic requirement in this regard. According to Ackoff (1994), System thinking view also emphasizes integration of the sub-systems for optimizing the system as a whole.

System dynamics as a modeling and simulation method could be used in various areas like Human Resource Management, Knowledge Management (KM) etc. For instance, Vancouver (2008) described a dynamic theory of work motivation using concepts such as feedback loops and causal relationships between variables. In the similar way, Chadwick and Dabu (2009) developed a causal model for understanding interlinks between human resource management and organizational competitive advantage.

This study is an attempt to identify some of the critical processes for long-term success of any organization with a systems perspective. Various processes have been identified through literature review and caselet study. Interpretative feedback loop analyses have been conducted for analyzing the caselets incorporated in the study. Total twelve case lets have been chosen for the study that largely focused on issues like knowledge management, learning, innovation, flexibility, organization culture, environmental changes etc., and summarized using feedback loop structures (Atwater and Pittman, 2006).

Methodology

This study has been done in two phases. The first phase of the study focuses on the review of literature on some of the critical issues like learning, knowledge management, innovation, flexibility, organization culture, environment uncertainty, systems thinking, system dynamics and casual loop diagrams. In the second phase, caslets study method has been used. The caselets from different organizations are discussed using casual loop diagrams. Total seven feedback loop diagrams using generic structures (Senge, 1990), have been developed using 12 case let studies. The causal loops have been discussed with respect to the caselets study itself.

The loops have been identified and selected based on the case let situation and the process of implementation, i.e. which kind of loop is fit for the particular case let. The feedback loop structure which is being considered relevant for the respective caselet has been used for that particular study. An innovation is done to interpret each link using interpretive matrix concept as a base (Sushil, 2005) to develop interpretive feedback loop structure.

For this study, secondary data have been used like journal papers and websites. The caselets study has been done using the secondary data available in documentary format available in the form of research articles. The references for the cases and its related keywords have been mentioned after each case. The key issues during implementation of KM process have been identified and discussed taking support from real life practical case examples.

The key issues raised in cases are summarized in a tabular form and discussed.

Literature Review

Change is a critical issue for organization's long term success. Like the Darwin's theory of survival that says that species which adapt the changes will survive and the failure in adapting the changes causes failure of survival; somehow similar situation can be seen for the organizations as well. Organizations are supposed to change themselves for long term survival and growth. One of the most known management thinkers of the 20th century (Peter Drucker) also predicted somehow similar that there will be a fundamental change in the way organizations will be running in the

future. Drucker predict about the importance of knowledge for organizational growth and success in future (Drucker, 1993). Just after two years, two great thinkers in the area of knowledge management, Nonaka and Takeuchi (1995) have elaborated the theory of knowledge-creation and given a concept of tacit and explicit knowledge.

Eibl and Schwenk (2009) have considered organizational knowledge as the lifeblood for the organization. The authors have developed a dynamic relational capabilities model and found that this kind of dynamic model helps in knowledge transfer and lead to innovation that ultimately provide competitive advantage to the organization.

According to Liebowitz (1999), “Knowledge management is 80 per cent about people and cultural change rather than technical development”. The statement is further supported by other researchers like Akhavan *et al.*, (2006) and Spender (2006). The findings suggest that organizational culture is the first barrier in knowledge management process and act as a critical success parameter for KM process implementation.

Due to the rapid environmental changes, organizations face huge pressures to react and adapt according to the changes. Organizations are now realizing the importance of change process for its success. Cultural resistance supposed to be the basic hurdle in managing the changes and organization should focus more on overcoming this hurdle. According to Mezias *et al.* (2001) learning and unlearning processes can be considered as a part of the change process in the organization.

Maurer and Weiss (2010) have given importance to the continuous learning process and suggested that competency in continuous learning supports organization to operate in a successful manner. Epstein (2003) view “that organizational learning is a prerequisite for organization well-being and survival” also support that learning is an important concern for any organization.

Knowledge management, learning, innovation and flexibility are some of the required processes for managing the changes. Diversity of knowledge in the organization provides more chances of learning and innovation. According to Simon (1995) diversity of opinion and approaches are required for creativity and providing options. Top management commitment, risk taking attitude, and compensation program promote innovation and act as a building block for innovation and organizational success (Denton, 1998). Organization flexibility can be used as a tool for control in a highly uncertain environment. Volberda (1997) has defined Flexibility as a way of increasing control in a highly turbulent environment. Organization flexibility can be seen as a strategic option where predicting the environment is not easy.

Case lets Study using Interpretive Feedback Loop Analysis

Feedback loops are useful in understanding the dynamic behavior of a system. Interpretation of the feedback loops explains the dynamism in the systems like *Positive feedback loops* reinforces about the happening in the system, and *negative feedback loops* self-correcting suggests the actions for corrections.

According to Le and Law (2009) system dynamics gives an idea to learn and understand the influence of different factors or variables on a system. The interaction between the objects/people in the system can be represented via feedback loops. The thinking is that any kind of changes in

one variable of the system will affect other variables also. According to Sterman (1994), System dynamics emphasizes feedback loops (reinforcing and counter-balancing), the non-linearity of relationships, and an operational understanding of cause and effect, rather than an associative (statistical) understanding of the organization as a system.

Causal loop diagrams have been considered as a part of system thinking concept. According to Le and Law (2009), a casual loop is “*a diagram that aids in visualizing how interrelated variables affect one another*”. The causal loop diagram clearly reflects the interrelations between the variables. The polarity on the arrow decides the kind of relationship. A positive (+) sign shows that one variable is having a positive effect on the other while a negative (-) sign reflects the inverse relationships between the variables. Using the cybernetics principles (proposed by Wiener, 1948) some casual loop relationship between the various dynamic organizational issues like learning, innovation, knowledge management, top management support, organization culture etc. have been developed in this paper.

In this study total *seven feedback loops structure* have been developed which include two reinforcement loops, two fixes that backfire loops, two limits to growth loop and one integrated complex loop. The details of the loops are discussed in further sections.

Loop 1 - Reinforcement Feedback loop analysis of “VIA”

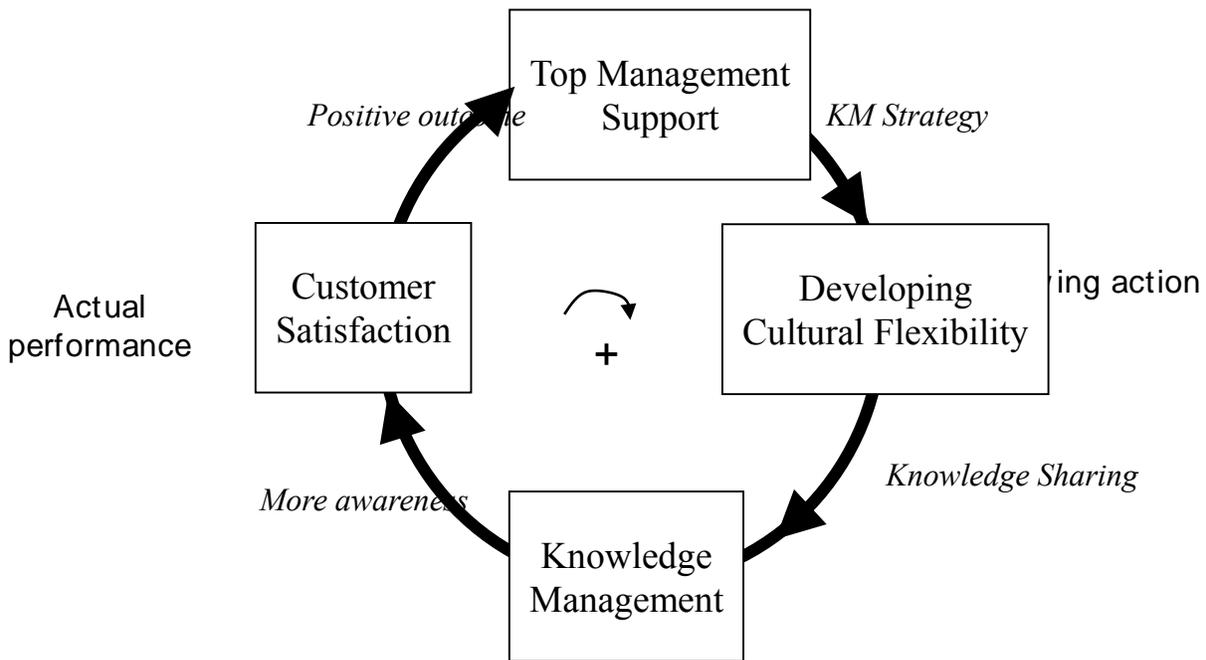


Figure 1: Reinforcement Feedback Loop - VIA

In VIA, The primary objective was to meet the customer demands and satisfy their needs. With this aim, it has implemented the knowledge management (KM) process in the organization. The

KM process helps in providing “anytime, document in hand” which was needed to achieve the organizational objective. The first step of KM implementation was to have the top management support to agree that knowledge management is required for the organization.

After getting the top management support, various methods can be used to help the department heads to develop a knowledge management strategy in the organization. The focus is more towards developing a flexible culture in the organization. This kind of cultural flexibility provides more freedom to employees to work in new projects, and support department managers to act as a motivator to help the employees. It fully utilizes its corporate culture in facilitating knowledge management implementation. With this model the department managers can identify the outcome of knowledge management process and depending on its success it can be extended further on large scale basis (Yeh *et al.*, 2006).

(Keywords: Customer satisfaction, knowledge management, organization culture, and top management support)

Loop 2 Reinforcement Feedback loop analysis of “Teletecnics”

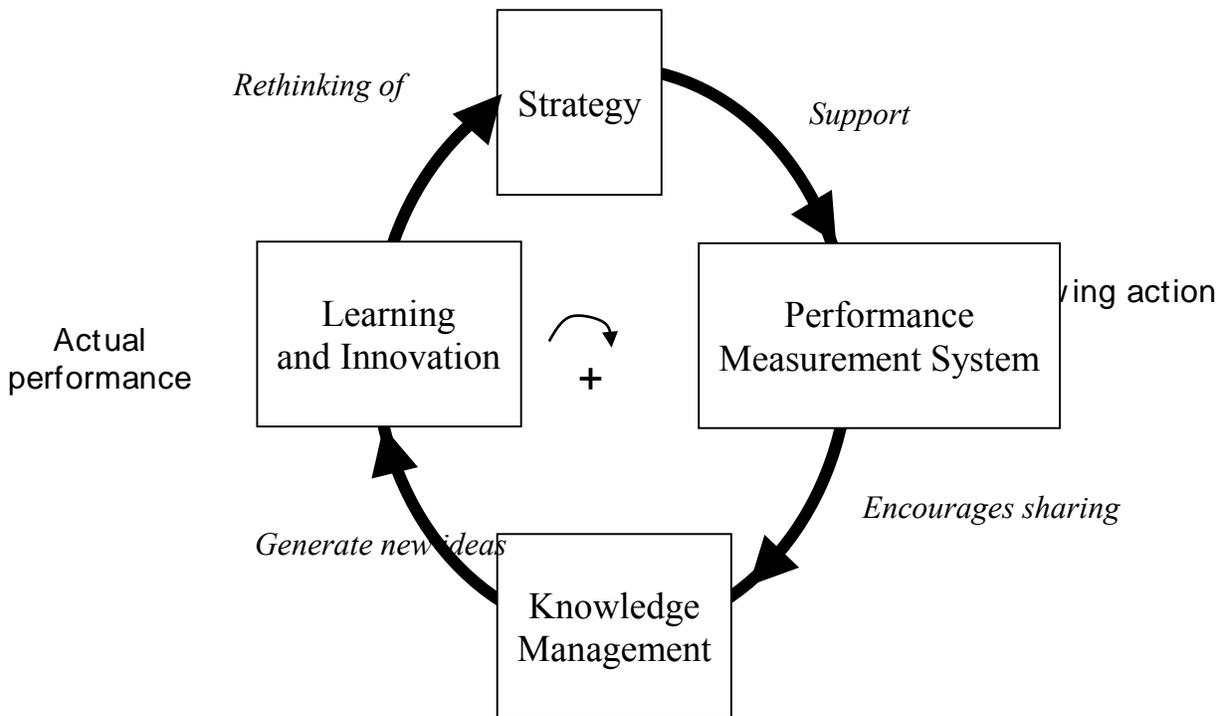


Figure 2: Reinforcement Feedback Loop - Teletecnics

The organization’s prime focus was towards developing itself as a learning and innovative organization. The organization strategy was developed with a central focus on promoting creative thinking, learning, and innovation process in the organization. For managing the learning process, knowledge transfer at individual as well as team level was considered as the important concern in

the organization. With this view Teletecnics has developed a new performance management system to stimulate the processes. The performance management system encourages members to share their knowledge and contribute towards knowledge management process. Increased sharing of knowledge generates new ideas and enriches the learning process in the organization (Molleman and Timmerman, 2003).

(Keywords: innovation, knowledge management, learning, performance system, strategy)

Loop 3 Fixes that Backfire Loop Structure for “Teltech”

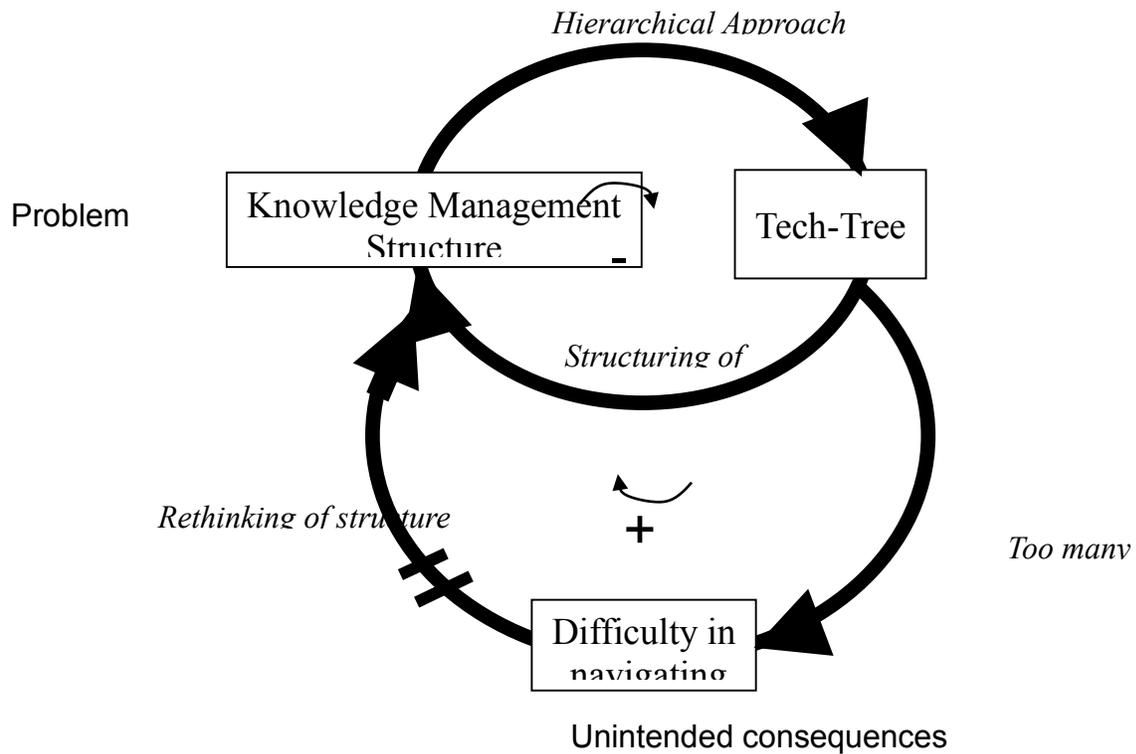


Figure 3: Fixes that Backfire Loop- Teltech

Teltech can provide a learning lesson for better management of knowledge and information assets. The company has a group of “knowledge engineers” to manage the information in its databases. It maintains thousands of technical experts who were from diverse background like from academics, ex-industry people, or consultants. It believe that some kind of supporting structure and strategy is required for managing the knowledge in the organization.

The most difficult part of Teltech’s services was the structural issues for categorization and searching of knowledge. Initially as a quick solution of this problem, it’s developed a hierarchical database named “Tech Tree” for structuring of the knowledge. The hierarchical database “Tech Tree” was having many knowledge branches, including scientific/technical, medical, chemical, etc. Although this was considered as a solution of the structural issue faced by the organization but

navigation of this kind of hierarchical database was a problem after some time. The navigation was not easy for both the clients as well as knowledge analysts. Due to this issue organization was again in the same situation like before. It understood the fact that categorization of knowledge is the first step before going for capturing and leveraging of knowledge (Akhavan *et al.* 2006).

(Keywords: navigation, strategy, structure)

Loop 4 - Fixes that Backfire Loop Structure for “e-Telco”

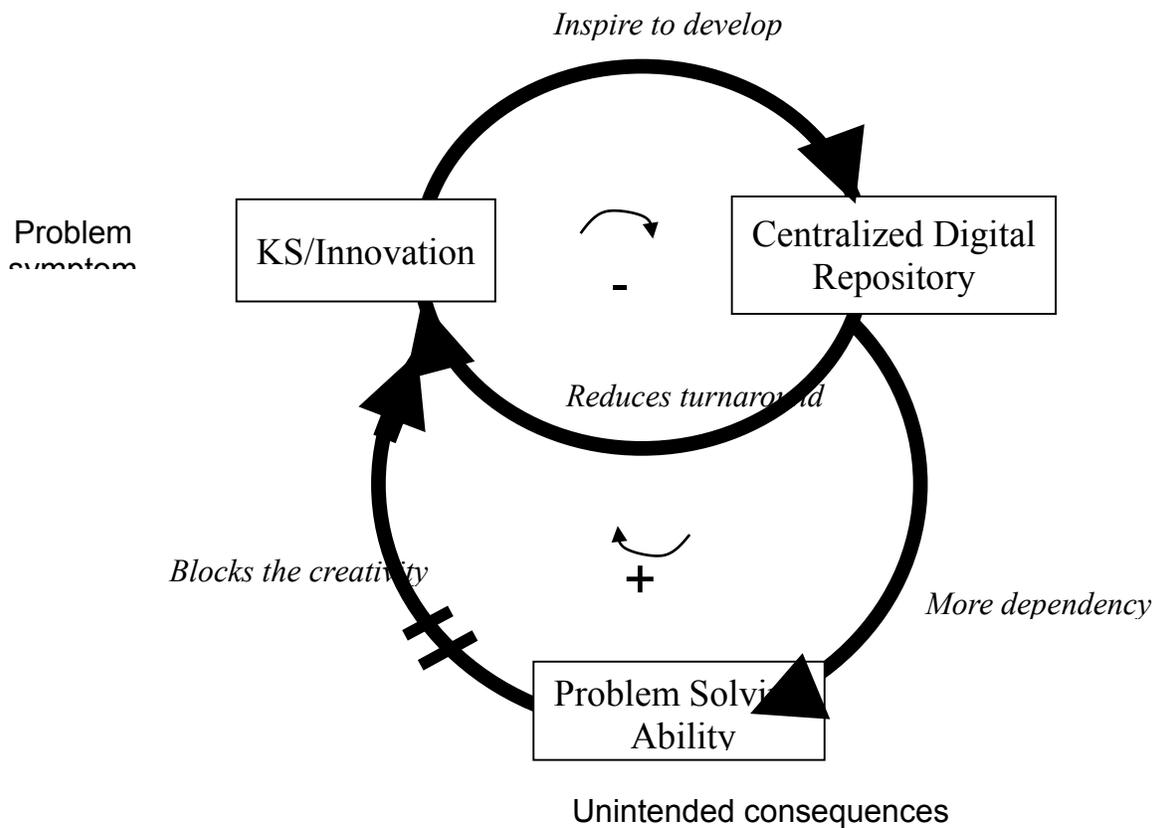


Figure 4: Fixes that Backfire Loop –e-Telco

This European-based company was providing telecommunication equipment and mobile services to its clients. In the organization, there are pre-defined maximum turnaround times for solving any problem based on their priority like for problems having high priority it was 3 days while for low priority problems it was defined as 20 days. Monthly average turnaround time of the employees was used for performance measurement of the technical support teams. Inspired by the knowledge sharing system in Xerox, it has developed a central digital repository “PREMUS”. The thinking behind this initiative was that it would reduce the turn-around time and hence improves the problem solving capability. The contribution

Pattern reflected that largely (90 per cent) the solutions were created by only 15 per cent of the experts i.e. the sharing of knowledge is limited up to a small group of people. People were become more dependent on the repository and stop thinking their own. This too much dependency on the PREMUS blocks the creative mindset of the members and further reduces the innovation process in the organization (Chua, 2009).

(Keywords: innovation, knowledge repository, sharing, turn-around time)

Loop 5 - Limits to Growth Loop Structure for “Canon”

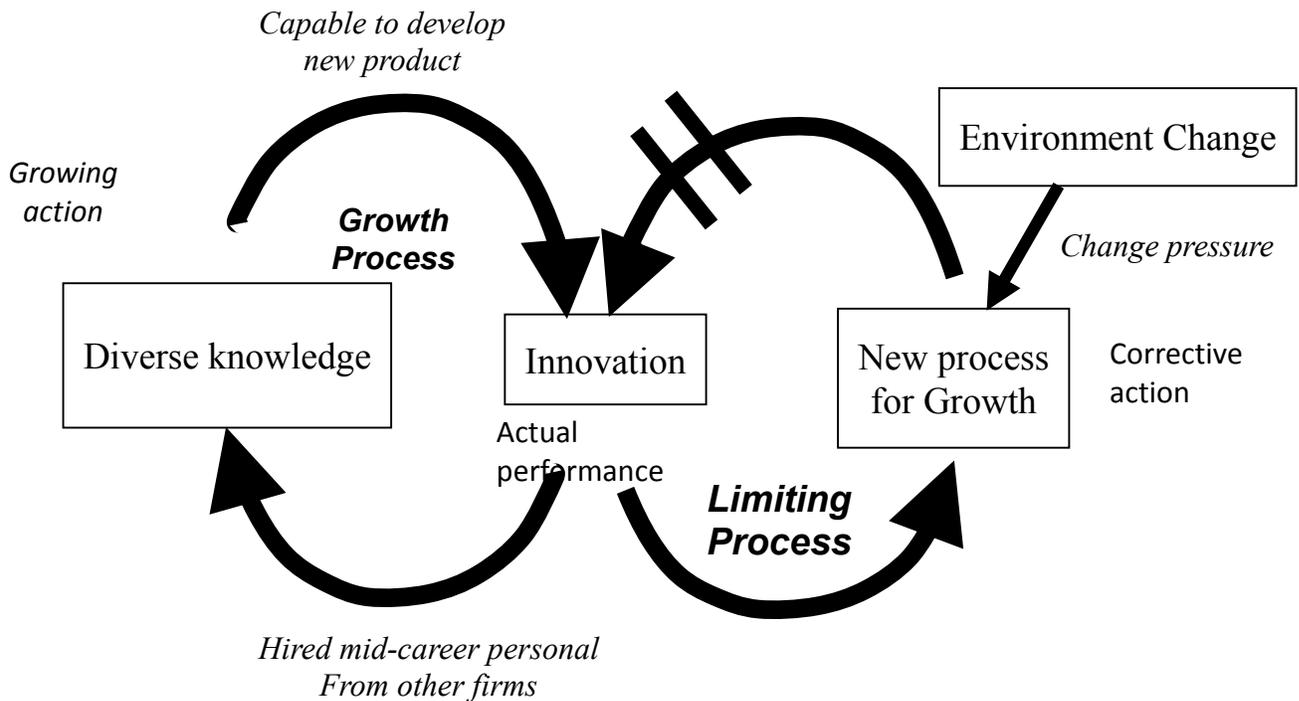


Figure 6: Limits to Growth loop - Canon

The organization was founded in 1933 with an initial aim of developing and manufacturing a 35 mm camera. During 1950s, the company was on a ladder of rapid growth but with respect to time, due to external environmental changes it was in pressure to diversify into new areas like office machinery and started developing electronic calculators and copy machines.

Its diverse knowledge base has provided strength to the organization to develop the required products as per market demands. The interaction among these kind of diverse technically capable people develop a creative environment in the organization and lead to innovative ideas or products which was required to lead in change oriented market. It had developed a “hiring mid-career personnel from other firms” policy to develop “counter-cultures” or diversity within the organization for increasing the potential of new information generation (Nonaka and Kenney, 1991).

(Keywords: environmental changes, innovation, knowledge diversification)

Loop 6 - Limits to Growth Loop Structure for “M-College”

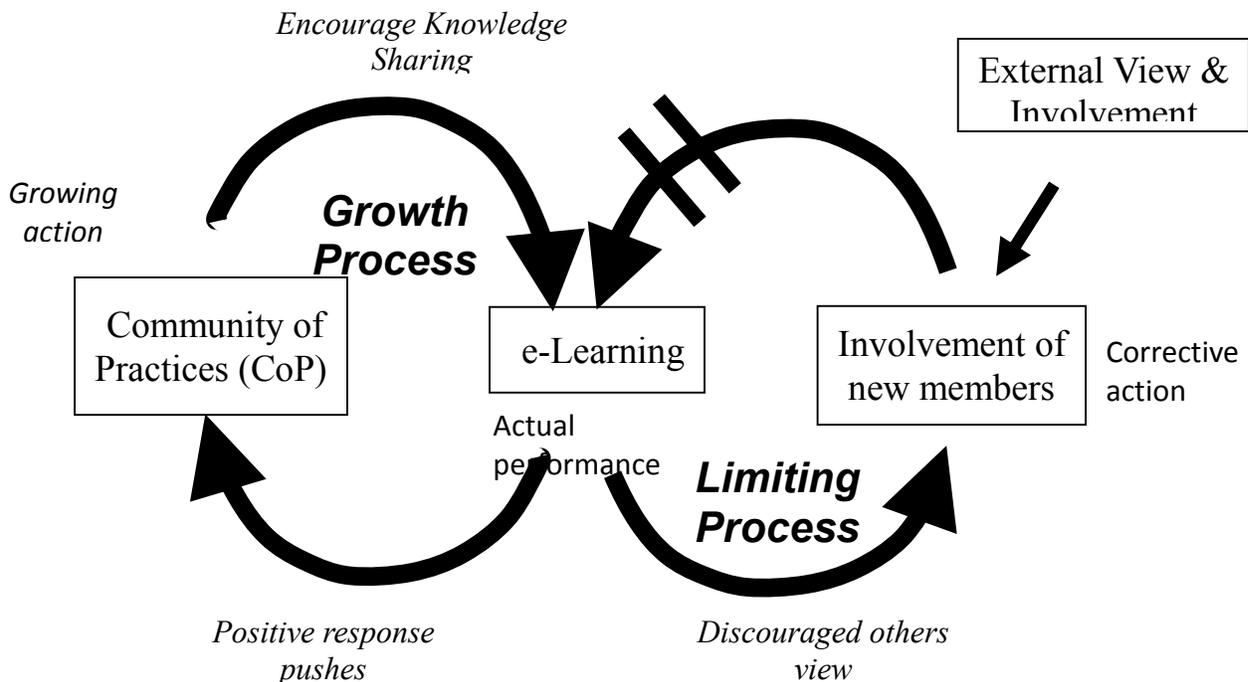


Figure 5: Limits to Growth Loop of M-College

It's a higher educational institute in Malaysia funded by the government. To develop the e-learning program, it decided to raise a group of e-learning champions from existing faculty. With seven people as a member of core group, it set up a Community of Practice (CoP) for encouraging the sharing of knowledge and spreading the e-learning practices in the organization. All the information related to the e-learning material, courseware and any other discussion related to this program was available on its sites. Individual mails were sent to faculty to invite them for joining the community. This kind of active initiative was highly praised by the organizational members. The feedback was positive which pushes to implement this program in broader sense.

But other than all these positive things about CoP, it had developed two syndromes; i) Dogmatism; and ii) Social alienation. The focus was more on promoting its own practices and tools as only acceptable e-learning form which discouraged the ideas from others hence the ideas from external people were blocked. The activity analysis shows that out of 300 registered members only about 15 were the active participants out of which 5 belong to the core group. To attract new members into the community organization did a few efforts (Chua, 2009).

(Keywords: community of practices, e-learning, external participation)

Discussion

The issues identified from case lets have been summarized in Table 1. The topmost right column given the numbers of times a particular issues comes in the study.

Table 1: Issues Identified from the Case lets

S.N.	Issues	Frequency
1.	Knowledge Sharing	4
2.	Flexible Culture	4
3.	Learning	3
4.	Innovation	3
5.	Knowledge Management Structure	3
6.	Environmental Changes	3
7.	Top management Support	2
8.	Strategy	1
9.	Performance Measurement System	1
10.	Customer Satisfaction	1

The more numbers in the right column refers that the respective issue is comparatively more important than the variable having lower frequency number. Flexible culture (4), knowledge sharing (4), learning (3), innovation (3), knowledge management structure (3), environmental changes (3), and Top management support (2) comes as the most important processes for organizational success. Based on the frequent number of issues an integrated loop has been developed which reflects the interrelationships among the most important issues comes after the synthesis of the caselets.

Loop 7- Integrated Causal Loop Structure Analysis of Six Caselets Study

1997). With the help of cultural changes it overcome the difficulty faced and developed flexibility in the organization.

In 3M, Workplace flexibility provides employees enough freedom to use their time for new thinking that further increases the innovation in the organization (Brand, 1998). The Assembly department in Philips Semiconductors was facing the problems of unstable environment. The organization believes that structural and strategic flexibility can help it to manage the environmental uncertainty (Volberda, 1997).

Conclusion and Future Research

This study suggests that system thinking can be applied for analyzing the organizational growth and success issues in an integrated manner. System view can help in better integration and understanding of the key processes for organizational success. The environmental uncertainty can be managed in a smooth way by incorporating all the sub-systems of the organization. Like the performance of a system depends on efficient working of its sub-systems and the integration of all its parts, similarly the processes in organizations are not independent and can be considered as part of large systems i.e. organization. The performance of organization can be improved by way of improving the performance of these sub-systems/ processes.

Knowledge management, learning, innovation, flexibility, environmental uncertainty, top management support and organization culture have been identified as critical processes for organizational long term success and growth. The final feedback loop has shown how these processes can be related with each other in the organization. The final loop shows that the processes may be interrelated either directly or indirectly.

This study has been done selecting twelve caselets and literature review. More number of caselets can be taken for further study and better generalization. The study can be used for validation purpose. Taking this study as a base, detail organizational study can be done for developing an integrated feedback loop for that particular organization which will help to understand the interrelationship among the processes and show a path for success planning in the form of strategy development.

References

- Ackoff, R. 1994. *The Democratic Organization*. New York: Oxford University Press.
- Akhavan P., Jafari M. and Fathian M. 2006. "Critical Success Factors of Knowledge Management Systems: A Multi-Case Analysis." *European Business Review* 18 (2): 97-113.
- Atwater J.B. and Pittman P.H. 2006. "Facilitating Systemic Thinking in Business Classes." *Decision Sciences Journal of Innovative Education* 4 (2): 273-292.
- Brand A. 1998. "Knowledge Management and Innovation at 3M." *Journal of Knowledge Management* 2 (1): 16-22.

- Chadwick, C., and Dabu, A. 2009. "Human Resources, Human Resource Management and the Competitive Advantage of Firms: Toward a more Comprehensive Model of Causal Linkages." *Organization Science* 20(1): 253–272.
- Change Management in New Product Development." *Management Research News* 29 (8): 512-523.
- Chinowsky P. and Carrillo P. 2007. "Knowledge Management to Learning Organization Connection." *Journal of Management in Engineering* 23 (3): 122-130.
- Chua A.Y.K. 2009. "The Dark Side of Successful Knowledge Management Initiatives." *Journal of Knowledge Management* 13 (4): 32-40.
- Denton, D.K. 1998. "Creating a winning organization, Empowerment in Organizations, Vol 6, 3, 81-93.
- Drucker P. 1993. *Post-Capitalist Society*. Harper Business: New York in Alberto Paucar Caceres and Rosane Pagano (2009) Systems Thinking and the Use of Systemic Methodologies in Knowledge Management. *Systems Research and Behavioral Science* 26: 343-355
Dynamics Review 23(2-3): 345-358.
- Epstein E.M. 2003. "How to Learn from the Environment about the Environment: A Prerequisite for Organization Well-Being." *Journal of General Management* 29 (1): 68-80.
- Forrester, J. 1968. *Industrial Dynamics*. Cambridge, MA: The MIT Press.
- Forrester, J. W. 1992. System Dynamics, Systems Thinking and Soft OR. Cambridge, Massachusetts, USA: Massachusetts Institute of Technology in *System Dynamics Review*, Summer 1994 10 (2).
- Forrester, J. W. 2007. "System Dynamics –A Personal view of the First Fifty Years." *System*
- Fuller, S.H. 1982. "Becoming the Organization of the Future." *Journal of Business Ethics*: 115-118.
- Johnson C. 1997. "Leveraging Knowledge for Operational Excellence." *The Journal of Knowledge Management* 1 (1): 50-55.
- Le, Mai Anh T. and Law, Kincho H. 2009. "System Dynamic Approach for Simulation of Experience Transfer in the AEC Industry." *Journal of Management in Engineering* 25 (4): 195-204.
- Liebowitz J. 1999. "Key Ingredients to the Success of an Organization's Knowledge Management Strategy." *Knowledge and Process Management* 6 (1): 37-40.
- Eibl, Marion W. and Schwenk J. (2009) "Lifeblood Knowledge": Dynamic Relational Capabilities (DRC) and Knowledge for Firm Innovativeness and Competitive Advantage." *Measuring Business Excellence* 13 (2): 7-16
- Maurer, T.J., and E.M. Weiss 2010. "Continuous Learning Skill Demands: Associations with Managerial Job Content, Age, and Experience." *Journal of Business and Psychology* 25 (1): 1-13
- Mezias J, Grinyer P, Guth WD. 2001. "Changing Collective Cognition: A Process Model for Strategic Change." *Long Range Plan* 34(1): 71-95.
- Molleman E. and Timmerman H. 2003. "Performance Management when Innovation and Learning become Critical Performance Indicators." *Personal Review* 32 (1): 93-113.

- Nonaka I, Takeuchi H. 1995. *The Knowledge-Creating Company*. Oxford University Press: New York.
- Nonaka I. and Kenney M. 1991. "Towards a new theory of innovation management: A Case Study Comparing Canon, Inc. and Apple Computer Inc." *Journal of Engineering and Technology Management* 8: 67-83.
- Reissner, S.C. 2005. "Learning and innovation: a narrative analysis." *Journal of organizational Change Management* 18 (5): 482-494.
- Richmond, B. 2001. *An Introduction to System Thinking*. Hanover, NH: High Performance Systems.
- Senge P. 1990. *The Fifth Discipline: The Art and Practice of the Learning Organization*. New York: Doubleday.
- Shari S.C. Shang, Shu-Fang Lin and Ya-Ling Wu. 2008. "Service Innovation through Dynamic Knowledge Management." *Industrial Management & Data Systems* 109 (3): 322-337.
- Simons C. 1995. "Chaos inc." *Across the Board* July/August: p. 35.
- Spender J.C. 2006. "Getting Value from Knowledge Management." *The TQM Magazine* 18 (3): 238-254.
- Sterman, J. D. 1994. "Learning in and About Complex Systems." *System Dynamics Review* 10: 291-330.
- Sushil. 2005. "Interpretive Matrix: A Tool to aid Interpretation of Management and Social Research." *Global Journal of Flexible Systems Management* 6 (2): 27-30.
- Vancouver, J. B. 2008. "Integrating Self-Regulation Theories of Work Motivation into a Dynamic Process Theory." *Human Resource Management Review* 18(1): 1-18.
- Volberda H.W. 1997. "Building Flexible Organizations for Fast-moving Markets." *Long Range Planning* 30 (2): 169-183
- Wiener, N. 1948). *Cybernetics: Or Control and Communication in the Animal and the Machine*. The MIT Press. Cambridge. Massachusetts, JohnWiley & Sons, New York, NY in Rodrigues, Lewlyn L.R., Dharmaraj N., and Shrinivasa Rao, B.R. 2006. "System Dynamics Approach for
- Thompson, J.P. and Cavaleri S. 2010. "Dynamic Knowledge, Organizational Growth, and Sustainability." *Int. Studies of Mgt. & Org.* 40 (3): 50-60.
- Yeh Y.J., Lai S.Q., Ho C.T. 2006. "Knowledge Management Enablers: A Case Study." *Industrial Management & Data Systems* 106 (6): 793-810.