The Role of Top Management in Using Knowledge Management as a Tool for Innovation – A System Dynamics Perspective

Vasanth Kamath, Lewlyn L. R. Rodrigues, and Pradeep Desai

***Abstract*— Innovation is the result of a complex dynamic process by which today's organizations delight their customers by delivering more non-monetary value with a high level of operational effectiveness. Various literatures surrounding this theory conclude Knowledge Management as the prime driver of Innovation for all firms. The firm's ability to embrace KM and hence encourage individual learning and innovative thinking is determined by a certain degree of support by the top management. This paper attempts to present a System Dynamics perspective to demonstrate the role of top management support in leveraging Knowledge Management (KM) as a tool for Innovation. The results reveal that the top management initiative is very essential in using KM as a strategic tool for innovation.**

***Index Terms*— Knowledge Management, Innovation, System Dynamics, Feedback, Causal Loop, Stock and Flow**

I. Introduction

In today's world each business and enterprise is constantly required to change; to be reinvented in order to provide new capabilities and perspectives; to be able to cope with new challenges; and to renew it to adopt new approaches, keeping those that work well and discarding those that are outdated. Those who step up to the challenges will likely survive, whereas those who shy away from them are likely to fail. To thrive and prosper considerable management skills and involvement of new professional skills such as Knowledge management (KM) is required. (Wiig, 2004)

Knowledge Management is based on the idea that an organization's most valuable resource apart from the 3Ms are the Knowledge of its people working within. Therefore, the extent to which an organization performs well will depend on how effectively its people can create and, share knowledge around the organization, and use that knowledge to best effect. Establishing a sound practice of KM is not an easy task as there are more barriers to KM than enablers. Ribiere (2001) mentioned that an atmosphere/ culture of trust are necessary to sharing knowledge.

II. Literature Review

For the manufacturers of today, innovation is the engine of growth. Innovation is when Knowledge from previously separated domains is exchanged and combined in new ways (Nahapiet and Ghoshal, 1998; Hargadon and Sutton, 2000; Justesen, 2001). The result of this innovative practice is Innovation when and only when this combination of domains leads to the successful diffusion of a new product, process or service (Schumpeter, 1934).

Borghoff & Pareschi, (1998); Spiegler, (2000) mentioned that, Innovation is a Knowledge- intensive process which means that proper Knowledge Management is necessary to support the Innovation process successfully.

Calabrese (2000) validated the four-pillar framework, suggesting key elements defining effective enterprise KM programs. This research inferred that KM requires the integration and balancing of leadership, organization, learning, and technology in an enterprise-wide setting.

For the success of KM, a streamlined organizational structure with strong cultures stands a higher chance (Velazquez, 2004; Ross, 2004). Ribiere (2001) examined the impact of interpersonal trust on knowledge-centered organizational culture. One can conclude from this research work that, an atmosphere/ culture of trust is necessary to sharing knowledge. Park (2002) examined KM technologies from an organizational cultural impact focus. He concluded that, Successful KM technology implementation requires an organizational cultural that promotes a blend of product and people orientation.

Only a good leadership and a sound administration can cater to all these requirements. Liu et.al (2007) concluded that management focus has a significant effect on organizational innovation in his study of the relationship between management practices and organizational innovation.

III. Model Development

The System dynamics methodology was proposed by J.W. Forrester. It includes five distinct stages which are

Manuscript submitted on 12th March, 2011.

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ISBN: 978-988-18210-6-5
ISSN: 2078-0958 (Print); ISSN: 2078-0966 (Online)

inter-related viz., Problem identification, System Conceptualization, Model formulation, Simulation & validation, and Policy analysis & improvement (Sushil, 1993).

Using the causal loop diagram (Fig. 1) as a starting point, the stock and flow model (Fig. 2) is set up for simulation in Ventana Systems VenSim modeling environment. Despite the dynamic nature of system models in general, the model has some constants, which reflect the assumptions made, to provide the basis for the model (Table 1). The constants presented at Table 1 realize that they are mostly market and industry related assumptions, even to that extent that these factors contain all the determinants of firm's business environment build in the model. This enables that the model can be customized relatively easily to new market settings by altering these constants.

The numbers used in this simulation are based on rough estimates from experience from business cases, and aim to replicate a sort of general industrial firm. Thus the results are also reported mainly for the purpose of highlighting the dynamics of the model more than anything else.

TABLE I
VARIABLES AND CONSTANTS USED FOR SIMULATION

Variables and Constants (Units)	Trial 1	Trial 2
Knowledge Management Tools (Dmnl)	0.25	0.75
Top management support (Dmnl)	0.20	0.80
Innovation cycle (month)	12	12
Price (INR)	95	95

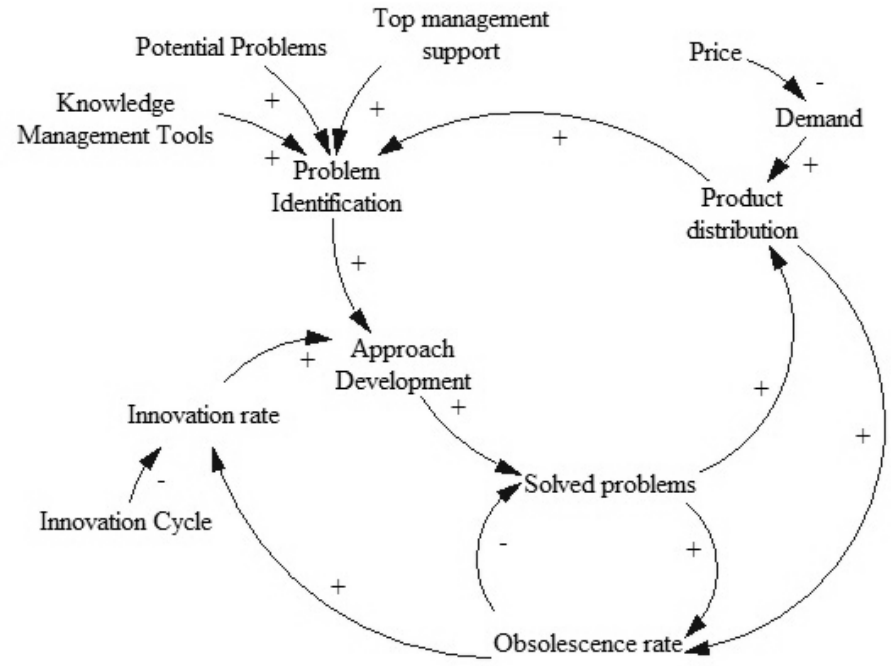

Fig. 1. Causal loop diagram highlighting the inter-relationships of the variables

ISBN: 978-988-18210-6-5
ISSN: 2078-0958 (Print); ISSN: 2078-0966 (Online)

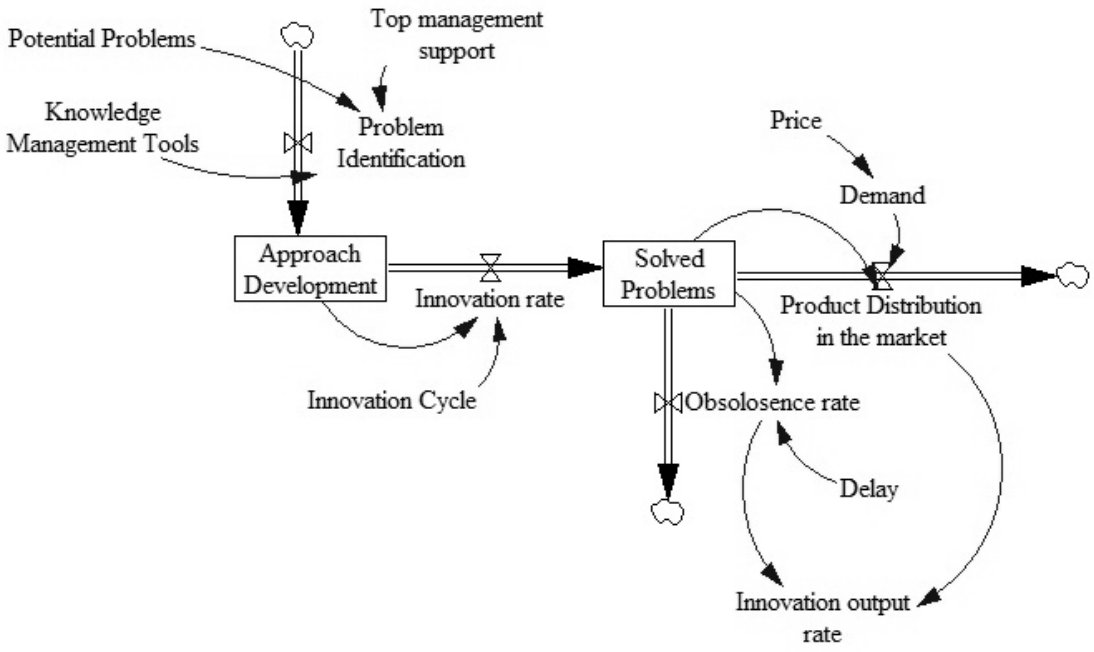

Fig. 2. Stock and Flow diagram

IV. Model structure

System dynamics approach to model the influence of top management support in KM initiative within a manufacturing industry is the focus of this research. The success of any product or a service totally depends on the market share or the distribution of products in the market. The market share can be measured by the number of customers using the product or the product demand. Simulation is controlled by varying the top management support factor and the KM tools factor keeping all the other parameters constant. An organization can turn around into a Knowledge organization provided if they have adequate KM tools and the most important an atmosphere or culture of trust. This can only be achieved if the top management is committed to promote KM in the organization. Knowledge Management, when used in the right direction, results in creative thinking, resulting in innovation. In this model, studies have been carried out to see the approaches developed to counter and the innovative solutions that are generated with and without the top management initiative to apply KM in the firm.

V. Results and Discussions

Two runs were simulated; the first run was a case where the top management was not considering the implementation of KM. The firm under consideration as a result displayed poor trends in developing approaches to solve the problem and also was not able to innovate. The second, considered a very acceptable approach by the top management for implementation of KM and hence, the output variables like approach development and innovative ability were on the positive trend. It can be observed that, the approach development plot hits a low at the initial stages. This can be attributed to the cultural barriers of KM, wherein the people are hesitant to share knowledge along with their counter parts.

A good administration can always help to promote a culture of mutual trust between the employees of the organization and orient their efforts towards achieving the organizational objectives (Kamath V. *et.al*, 2009). Once this is developed, the knowledge sharing amongst people will develop and hence the parameters of study viz. approach development and Innovation rate increases.

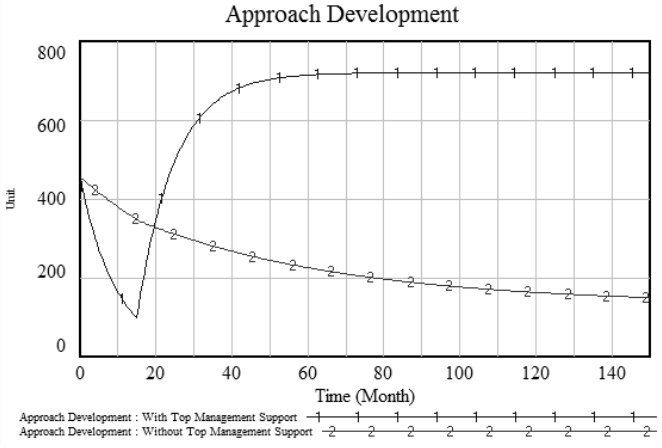

Fig. 3. Effect of Top management KM initiative on approach development

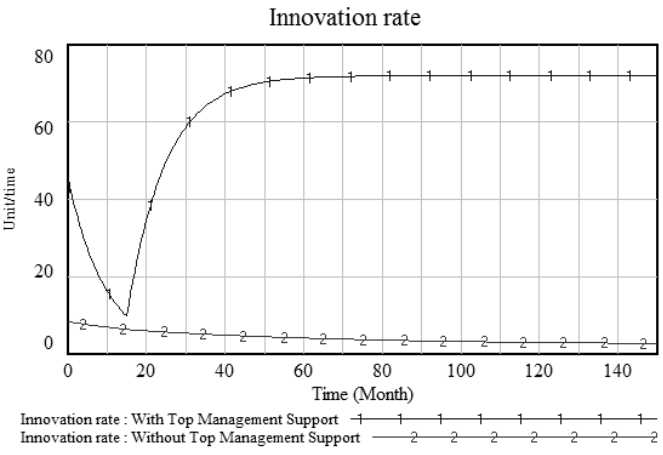

Fig. 4. Effect of Top management KM initiative on Innovation rate

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VI. Conclusions

Even though, it is obvious that organizational knowledge starts to improve on implementation of KM strategy, it takes time to streamline and bear fruits and reflect on the organizational performance in-terms of developing new approaches to solve the problem. As observed in the results, it can be concluded that the factors under consideration like approach development and innovation rate have a very slow but a gradual growth in the initial years of implementation. But over a period of time the variation follows an exponential rate of growth. This is a typical behavior of a reinforcing loop in the structure which will remain dormant at initial stages but once it gains the required momentum it expands exponentially.

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ISSN: 2078-0958 (Print); ISSN: 2078-0966 (Online)