

Knowledge Management and Innovation Strategy Implementation: Challenges and Prospects for Firms Survival

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This paper is an attempt at how a poorly implemented knowledge management and innovation strategy could adversely affect firms performance and competitiveness, especially in the area of market growth, sales and profit growth, new product development and productivity, however under this circumstance the paper has attempted an integration of Charnes, et al (1978), Banker, et al (1984) and Zhu and Shen (1995), as a model for the IRS (Increasing returns to scale) and DRS (Decreasing returns to scale) to bring to fore how a poorly implementation of KM and innovation strategy could affect firms efficiency frontier as this will affect the firms productivity and the way forward is for such firms to adopt a paradoxical variability approach that ensures duality, continuous change, harmony and balance of firm's resources for sustainable competitiveness

Field of Research: Knowledge, Innovation, Implementation, and Strategy.

1. Introduction

The business environment has become turbulent and competitive, knowledge and innovation has been identified as one of the most strategic inputs for sustainable competitive advantage and performance booster for many firms, according to Frey,(2001), Okunoye and Karsten (2002), this phenomenon is regardless of size and geographical locations, however there seems to be a gap amongst literatures on the implementation of knowledge management and innovation strategy for firms competitiveness because a wrong approach to implementation could have a serious consequence on knowledge and innovation strategy of firms. It is important to note that demographic variable is the degree of knowledge intensity and according to Ceci (2005), knowledge-intensive firms are organizations that offer to the market the use of fairly sophisticated knowledge or knowledge based products. The years of involvement in knowledge management is an important demographic variable therefore firms with greater years of involvement have more experienced and competent managers compared to newer firms and this explains why older firms tend to be highly dependent on their managers for decision making, since they have accumulated much experience and are considered to be highly knowledgeable, Ng, Ng and Yong (2002).

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However, Chang and Lin (2008) have argued that newer organizations with loosely defined culture are able to accept new practices such as knowledge management and innovation. Top management of knowledge intensive firms devotes special attention to develop, share, and utilize knowledge, as knowledge is relevant as an input, and as an output, knowledge of personnel in knowledge-intensive firms is often used as inputs to create products or services and the output of knowledge-intensive firms is characterized by a high degree of knowledge content. Knowledge –intensive firms are becoming increasingly important in today's competitive environment and it has become a very important research area, however this paper will attempt to look at how a rightful/wrongful implementation of knowledge and innovation strategy can affect the profit growth, market share, productivity, new product development, etc of a firm and develop a strategic approach to this quagmire.

This paper will be divided into 5 sections; the next section will review literatures pertaining to the study, followed by methodology, the policy implication and conclusion.

2.Literature Review

Many scholars have written on Knowledge management strategies and innovation, but this current write up is an attempt to fill a gap amongst the literatures by looking knowledge management and innovation from the perspective of implementation to achieve competitiveness and firms survival in this era of short product life cycle and the need for a pragmatic change of both the business and technological model of firms, in order to be relevant in the 21st century.

Many literatures on this subject matter has increased the development of interest in Knowledge management and this include studies on knowledge management and knowledge based strategies both at group, individual and firm level. Bath, (2002),Maier and Remus (2002), Russ, etal (2005) have all asserted that knowledge management is an element in or support for various business strategies, similarly Allee (2000), Barney (1996), Carlisle (2000), Collis and Montgomery (1995), Grant (1991), Prahalad and Hamel (1990), Zack (1999) and (2002), have all posited that the influence of resources and knowledge based theory with emphasis on strategy has shifted from a product/market positioning perspective to one based on resources and capabilities that can be leveraged across a range of products and markets.

Bierly and Chakrabarty (1996), Ordonez de Pablos (2002) have all discovered that the knowledge based view is the primary rationale for the firm in the creation and application of knowledge, knowledge that is embedded in organizational routines and professional competence that is unique and difficult to imitate has become the most important strategic resources and capability for building competitive advantage particularly within networks, therefore Ordonez de Pablos (2002) has posited that knowledge management strategy is a process that links organizational knowledge with the design of organizational structure and this foster knowledge, business strategy along with the development of knowledge workers.

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A firm is believed to have a competitive advantage when based on its strategic architecture (i.e its resources and combinations of resources that together produce a greater return than they would alone). Similarly, April (2002), Barney (1991), Ordonez de Pablos (2002) and Teece (2001), all believed that a firm could implement a knowledge strategy that generates returns and benefits in excess of those of current competitors. Therefore knowledge based strategy formulation should start with the primary intangible resources, the competence of people (as people are seen as the only true agents in business), all tangible physical products and assets as well as intangible relations are results of human actions and depend ultimately on people for their continued existence, people can use their competence to create value in two directions, Firstly by transferring and converting knowledge externally or internally to the organization to which they belong, secondly, Sveiby (2002), posited that it can also be helpful to distinguish between strategy and knowledge as something people have and instead to focus on the process of strategizing and knowing as something that people do, therefore, the following scholars, Cavalieri and Seivert (2005), De Tiene and Jackson (2001), Grant (1991), Jarzabkowski (2003), Johnson et al, (2003), Santos and Eisenhardt (2005), Whittington (2003), have all resolved that strategy formulation emanating from the flow of micro-practices, processes and negotiations reflects everyday organizational life. Moreover knowledge is neither homogenous nor one dimensional, assuming different shapes and consistency in an organization and being linked to resources inside and outside the firm and the context in which it operates. According to Belini and Lo Storto (2006), at any given time the stock of knowledge in a firm is both the result of events, partially, randomly and not controllable by the firm and of chosen and planned by its management. Weilinga, Sandberg and Schreiber (1997) has posited that knowledge management initiatives require a more integrated and comprehensive approach that embraces the administrative, cultural and technical aspects of organizations, similarly, Bohn (1994), Kim, et al (2003), it is important that the approach to knowledge strategy planning take account of both an enterprise wide perspective aimed at the organizational performance and a process-level perspective aimed at the provision of task or process-related knowledge, moreover, Davenport, Javenpaa and Bears (1996), Kim, etal (2003) and Maier and Remus (2002), have concluded that process-oriented strategies that guide the design and implementation of business and knowledge have been presented as closing the gap between knowledge and business strategy.

It is therefore necessary to focus on how knowledge has accumulated overtime, layer by layer, which is the outcome of a process of knowledge and competence accumulation aimed at achieving the strategic goal of the firm.

On the other hand, it is imperative for the firm to always come up with innovative products in order to survive competition, many scholars have propounded different meaning of innovation, to Drucker (1985) innovation may be referred to as the outcome of an innovative process or to the innovative process itself, however Drejer (2002) preferred the term "innovation" just for the result of the innovative process and " innovation management" for the managerial activities that attempt to control the innovation process.

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The term innovation most importantly implies newness, to Johannessonetal, (2001) innovation activity may relate to new products, new services, new methods of production, opening new markets, new sources of supply, and new ways of organizing, similarly, Freeman (1982), Dickson and Hadjimanolis (1995) have all posited that innovation has been characterized as a process of commercialization of a newly developed product or practice, however, Johnne (1999) have identified three types of innovation, viz Product innovation, process innovation and market innovation.

Product innovation provides the most obvious means for generating revenues, while process innovation provides the means for safe guarding and improving quality with cost savings, for market innovation, it is concerned with improving the mix of target markets and how chosen markets are best served, its purpose is to identify new or better potential markets and new or better ways to serve target markets, Ojasalo(2003), Ojasalo and Olkkonen (2005) has emphasized the role of effective use of market information particularly in the case of product and market innovation while Biemans and Hamsen (1995) opined the inclusion of generation, internal dissemination and firms responsiveness to market information as important to product and market innovation. Abetti (2000) has identified three types of innovation, viz highly radical, radical, intermediate, significant incremental or minor incremental.

Highly incremental innovation is a unique original product or system which will obsolete existing ones, it is based on proprietary technology beyond the state of art and major R&D. Radical innovation is a new product or system with original state of the art proprietary technology that will significantly expand the capabilities of existing ones and requires significant R&D. Intermediate innovation is a new product with proprietary technology, however it may be duplicated by others, it is a mix of standard and special features and it requires R&D. Significant incremental innovation refers to significant extension of product characteristics with original adaptation of available technology, it is characterized with limited patent protection and minor R&D. Minor incremental innovation refers to incremental improvement over existing products, it is a standardized product and an application of current technology, it has no patent protection and requires no R&D.

However the term innovation management encapsulates the management of the whole process of innovation from the idea generation stage through product or process development/adaptation to launch in the market or start, according to Rothwell (1992) and Dickson and Hadjimanolis (1998), this includes both strategic and operational issues, Dreijer (2002) brought forward the following activities and contexts of innovation management, i.e, technical integration, the process of innovation, strategic technology planning, organizational change and business development. Technological integration refers to the integration between technologies and the product markets of the firm and emphasizes the importance of satisfying the customer with the innovation of the firm. The process of innovation refers to the cross functional activities that create innovation across the departments of the firm, strategic technology planning means planning of technology and competence projects with the aim of maintaining a balanced portfolio of technology or competence, organizational change is relevant in the context of innovation. Since it is often difficult to speak of innovation without considering

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organizational change. Business development is also relevant in the context of innovation because innovation can both drive and be driven by business development.

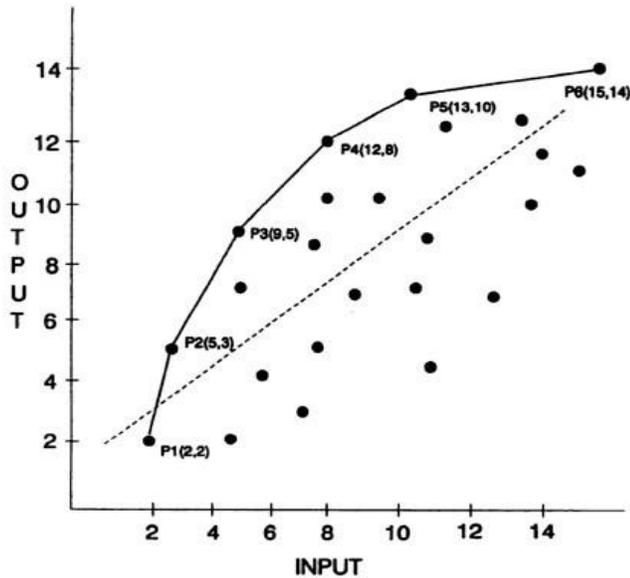
From the reviewed literatures, it was discovered that firms' competitiveness originates from the possession of special resources, such as knowledge and innovation capability that are valuable, heterogeneous and cannot be imitated or substituted. This type of resources ensures a firm's superior position in strategy, technology and management in a certain field, as knowledge and innovation capability is beneficial to a firm. It also contributes to its improvement of competitiveness for new product development provides the potential for knowledge and innovation for firms to gain a preferred market position in relation to their rivals and realize more reliable returns than would otherwise be possible, however a wrongful implementation of knowledge management could affect the above objectives of firms.

3. Methodology

Knowledge and innovation management strategy implementation is very important for firms success to achieve competitive advantage, as firms competitiveness originates from the possession of special resources such as knowledge and innovation capability which are vulnerable, heterogeneous and cannot be imitated or substituted, these type of resources ensures a firm's superior position in strategy, technology and management in certain fields, as knowledge and technological innovation capability is beneficial to a firm, it also contributes to its improvement of competitiveness, for new product development provides the potential for knowledge and innovation firms to gain a preferred market position in relation to their rivals and realize more reliable returns than otherwise be possible. However, due to the non availability of relevant data to analyze this paper, an attempt will still be made based on the integration of both Charnes, et al (1978), competitive returns to scale (CRS) to determine core-competence frontier of the input-output strategy of competitiveness and Zhu and Shen, (1995), was used for solving the problem of technical inefficiency in the model, this paper will employ IRS (Increasing Returns to Scale) and DRS (Decreasing Returns to Scale) strategy to describe how a wrong implementation of knowledge and innovation strategy can adversely affect firm's competitiveness, especially its profit growth, sales growth, new product development, productivity, etc.

The CCR ratio model (1978) and the DEA approach is often employed to provide an analytical tool to determine the effective and ineffective performance, when multiple measures of performance and various discretionary and exogenous variables are involved in order to bring out theories of best practice behavior. The CCR models generalize the output/input ratio measurement of efficiency for DMUs (Decision Making Units) and also calculate the pareto efficiency of each of each DMU.

Figure 1: Frontier Derived by DEA



Sources: Data Envelopment Analysis, Theory, Methodology and Application: by Abraham Charnes et al.

From the above diagram the tick line revealed the best practice production frontier, meaning the maximum output empirically obtain from any DMU given its level inputs. The other ones that lie below the frontier are the inefficient DMU; here the DEA identifies the sources and level of inefficiency for each of the inputs and outputs, furthermore the DEA determines the level of inefficiency by comparison to a single referent DMU or a convex combination of the other referent DMUs located on the efficient frontier that utilize the same level of inputs and produce the same level of outputs.

$$(CCR) \text{Min } \theta - \epsilon (\sum_{i=1}^m S_i^- + \sum_{r=1}^s S_r^+)$$

$$st \sum_{j=1}^n \lambda_j x_{ij} + S_i^- = \theta_0 X_{i j_0}, i = 1, 2, \dots, m$$

$$\sum_{j=1}^n \lambda_j Y_{rj} - S_r^+ = Y_{r j_0}; r = 1, 2, \dots, s$$

$$\theta_0, \lambda_j, S_i^-, S_r^+ \geq 0, \dots \text{Eq}(1)$$

Where,

$\theta_0 = \text{objective function's value}$

$$0 < \epsilon \ll 1 =$$

Non-archimedean infinitesimal, this is employed to overcome the difficulties of testing multi-optimum solutions

$\lambda_j = \text{convex co-efficient}$

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$Xi_{j_0} = i_{th}$ Input for firm j_0

$i = 1, 2, \dots, m$

$yr_{j_0} = r_{th}$ Output for firm j_0

$r = 1, 2, \dots, s$

m and s are respectively the number of inputs (ie Innovation capability dimension) and outputs (competitiveness factors) for the current study we assume firm j_0 produce s different outputs y_{rj} ($r = 1, 2, \dots, s$) utilizing m different inputs x_{ij} ($i = 1, 2, \dots, m$) S_i^- and S_r^+ are inputs and outputs slack variables respectively. If in optimality, $\theta_0^* = 1$ and all inputs and outputs slack variables, S_i^{-*} and S_r^{+*} are equal to zero, then the firm j_0 is CRS (Competitive Returns to Scale) efficient and is operating on the efficiency frontier, otherwise if $\theta_0^* \neq 1$ and /or some inputs/output slacks are non-zero then firm j_0 is CRS – inefficient, which implies that some latent and firm’s special resources are still not being penetrated and not being fully utilized, this indicates its competitiveness has not been fully tapped effectively, this inefficiency could be caused by inefficient harmonization and integration of various innovation assets in the firm.

The value of θ_0^* measures the input savings by possible proportional input reductions. In practice θ_0^* can be considered a possible reduction proportion (gap) of innovation capability from the optimality frontier. The smaller θ_0^* is the worse innovation efficiency of the firm.

But on the other hand, a firm operating at optimality represents both technical efficiency and scale efficiency, however in practice increasing or decreasing returns to scale (IRS or DRS) is likely to happen it is therefore necessary to analyze scale efficiency of the firm j_0 . By incorporating an additional constraint (BCC) of $\sum_j^n \lambda_j = 1$ into the CCR model and this becomes (BCC)

$$\text{Min } b_0 - \epsilon (\sum_{i=1}^m S_i^- + \sum_{r=1}^s S_r^+)$$

$$\text{St } \sum_{j=i}^n \lambda_j x_{ij} + S_i^- = b_0 Xi_{j_0}, i = 1, 2, \dots, m$$

$$\sum_{j=i}^n \lambda_j y_{rj} - S_i^+ = y_{rj_0}, r = 1, 2, \dots, s$$

$$\sum_{j=i}^n \lambda_j = 1$$

$$b_0, \lambda_j, S_i^-, S_r^+ \geq 0, \dots \text{Eq}(2)$$

Where,

b_0 Objective function’s value

This model can be used to determine technical efficiency but not the scale efficiency, Banker, etal (1984) and Zhu, (2000) but not the scale efficiency. Assuming we define

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returns to scale (RTS) by the ratio of a CRS score of model (CCR) a VRS (value returns to scale) score of model (BCC) i.e. θ_0^*/b_0^* . If the ratio is less than one, i.e. $\theta_0^*/b_0^*=1$, then firm j is scale efficient otherwise if the ratio is less than one, i.e., $\theta_0^*/b_0^*<1$, then firm j is scale inefficient. However to determine whether IRS (increasing returns to scale) or DRS (decreasing returns to scale) is the cause of scale inefficiency, Zhu and Shen (1995), provides a good method to solve this problem, that is if CRS score is equal to the VRS score, i.e. $\theta_0^* = b_0^*$, then CRS prevails, otherwise if the CRS and VRS are not equal, i.e. $\theta_0^* \neq b_0^*$, then $\sum_{j=1}^n \lambda_j^* < 1$, in CRS model indicates IRS, while $\sum_{j=1}^n \lambda_j^* > 1$, indicates DRS. This method can therefore be used to judged the technical and scale efficiency of competitiveness returns to scale (CRS)/Inefficient firms.

4. Discussion, Policy Implication & Conclusion

Many firms in today's constantly changing business environment are often confronted with the problem of implementing a good knowledge management and innovation strategy to achieve sustainable competitiveness, and this is why it is important for top managers to always be flexible in their strategic choices and always adopt a paradoxical view of knowledge management and innovation strategy in which the opposing forces in knowledge and innovation contexts are understood in terms of duality, mutual dependence, continual change with harmony and balance as this will be the only way for firms to regain relevance and competitiveness after a wrongful implementation strategy.

Similarly, organizing with regard to knowledge management strategy, require formal planning and the emergent approach are complements and forms part of good planning, especially in the unstable business environment. Formal planning is the same as organizing and can be described as more aggressive, more interventionist, more engaging and more inclusive, this should always be sought and recognized by the firm.

Moreover, organization managers should be less formal, as a highly formalized planning process may appear ineffective in some uncertain environment, for without a paradoxical approach to respond to this call, top managers may spend less time in formal business planning meetings and use the available time to respond to the current day's issues and plan less far ahead into the future, similarly less formal planning might result in inadequate evaluations, where it could in fact be beneficial. Alternatively, with a paradoxical view, the interaction of formal and informal planning would be recognized and taken into consideration, as extensive formal planning may enable a firm to formally set aside time and effort for both short term (emergent) and long term (deliberate) planning, thus the firm is better prepared to communicate about and act upon suddenly changing information and conditions, because it does not have to figure out how to respond for this purpose, has it already have a process set up to handle it. The end result of using the paradoxical strategy is that more attention is paid to formal planning, so that enough informal planning can be performed.

More so, there should be a better or balanced harmony between control and autonomy as groups can be more flexible and perform more effectively when they operate with

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control mechanisms such as formal interventions. At the same time autonomy can actually make control more effective, when they are in harmony, the relationship generates a virtuous cycle where control and autonomy attract each other, as undue preponderance of one side tends to lead to the firm's failure in the form of rigidity (lack of creativity) or chaos (lack of structure).

However, high performing firms must be both highly differentiated and well integrated, as knowledge differentiation alone without integration can be a barrier to firms' innovation, instead, knowledge differentiation is not inferior to integration and vice versa. Effective knowledge management and innovation strategy must seek both and their complementary for creating innovative products and processes, where knowledge differentiation is the basis for knowledge integration, which further enables more differentiation.

Similarly, firms should always focus on the idea that small is big and powerful, for organizing in small structures are simple and easy to organize, by promoting ambidextrous leadership that maintain multiple cognitive styles and behaviors. Multiple product innovation requires intensive knowledge creation and sharing activities among firm members, especially for firms with successful product portfolios, where semi structures emerged in each time frame, with some responsibilities, meetings and priorities set, but the actual design process was almost unfettered, while in a group setting, formal but simple interventions such as meetings can play the role of semi structures that enabled both knowledge creation and sharing by members of the organization.

The larger the size of the firm, the larger the role of information technology, for a paradoxical firm, the idea of firm systems or large scale organizational technologies has been attractive to many of today's firms, however such firm's technologies always focus on one pole, like integration, control and formalization, while the other pole is largely neglected or underemphasized. These are large and complex, rather than small and simple structures, therefore they are likely to hinder a paradoxical organizing, while the opposite outcome may occur simultaneously.

Knowledge management technologies also play the role of semi or minimal structures for paradoxical firms, particularly in large organizational settings, for technologies like semi-structures need to exhibit partial order and they lie between the extremes of very rigid and highly chaotic organization. Socio-technical systems theory, therefore, suggests that for technologies to exhibit the characteristics of minimal structures, they should be designed according to a principle of minimal specification. This principle states that 'no more should be specified than is absolutely essential and while it is necessary to be quite precise about what has to be done, it is rarely necessary to be precise about how it is to be done' (Cherns, 1987, pp 155).

Similarly, this allows knowledge management systems to be both designed and emergent in technology-in-use and ultimately supports paradoxical organizing as flexible electronic communication systems may support both knowledge integration and product differentiation. Simultaneously, this communication systems combines two

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representation techniques (i.e cognitive maps and narrative structures) for constructing, sharing knowledge and innovation effectively among different communities of practice in the firm, because they ease the difficulties strangers have with contracting individuals across hierarchical, geographical and organizational boundaries.

It could be discerned from the above that many firms often have problems when implementing their knowledge management and innovation strategy, as they grab too hastily, for what seems like the next answer to firms growth, as conventional wisdom of strategic implementation needs a paradoxical approach that recognizes success in any market, accrues to firms with duality, continual change with harmony and balance along with coherence that a tight match between their strategic direction and the capabilities that make them unique, as only firms with duality takes a sharpness of focus that only exceptional firms have mastered and this explains why they are winners in their target markets and this is what the paper has attempted through a paradoxical view of duality.

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