

A Novel KM Framework for Fostering Creativity and Stimulating Innovation

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Abstract—Knowledge Management (KM) is a dynamic system to identify important information, collect it from those who possess it, store it, and finally, share it with those required including employees, customers and other stakeholders. Today, a good KM system consolidates a company's internal expertise with external information by generating and collecting as much as useful information in order to improve processes, customer relations, decision making, employee morale, performance and most importantly revenue and profit. This paper explores the framework of KM by identifying two core phases, i.e., knowledge creation and knowledge usage and then maps each respectively to creativity and innovation. Invention and innovation are extremely dependent on the availability and richness of knowledge; however, the major challenge in many organizations is that KM is focused on maintaining continuity and consistency of capturing that knowledge and publishing it appropriately in order to be used by those who need it. This structure alone treats ineffectively with the creativity and invention process and leave not much spaces for innovation to be stimulated. Meanwhile, there is no solid measurement tool to assess performance and productivity of KM systems. In order to address these challenges, this paper integrates the four traditional steps of KM including Capturing, Storing, Disseminating and Implementing by Planning, Leading and Adapting (PLA) aspect to form a two dimensional model for directing and leading the whole KM process. The new model can potentially foster creativity in the first two steps of capturing and storing and then stimulate innovation in the second two steps of disseminating and implementing. Finally, the paper studies Apple Inc., as one of the most innovative companies in order to illustrate the possible application of this novel model.

Keywords-*knowledge management; creativity; innovation; evaluation; assessment; value creation; Apple, Inc.*

I. INTRODUCTION

Knowledge Management (KM) is simply defined as a dynamic system to identify important information, collect, store, and finally share it with those required this information including employees, customers and other stakeholders [1]. KM is an emerging concept and has been around for more than 20 years in terms of growth as a discipline. Meanwhile, in today competitive world and global economy, where its characteristics is described by rapidly evolving technology, shorter product lifecycles and higher rate of new product development, organizations need to foster creativity and innovate their products, services and policies. This approach will enable them to prosper and keep up with highly dynamic environment.

Some anecdotal evidence suggests that KM is more widely accepted within certain industries like the pharmaceutical, energy, aerospace, and manufacturing. These knowledge intensive industries are the leaders in KM organizational adoption as well as creativity and innovation by leveraging new knowledge throughout their organizations, customers and stakeholders. Much is said about the role of KM in supporting innovation within organizations and this is also closely tied in with enhancing the activities of 'knowledge workers' in dynamic organizations such as consulting firms. It is worth remembering that business organizations are neither built for KM, nor for innovation; they are built for profit making and increasing stakeholder's value. This can be achieved by meeting and exceeding what customers perceive as value for price. It is widely recognized that KM can drive and support innovation within organizations, through a wide variety of approaches and techniques which can be embedded within KM frameworks. Bates and Khasawneh [2] suggested that innovation is equated with the adoption and application of new knowledge and practices, including the ability of an organization to adopt or create new ideas and implement these ideas in developing new and improved products, services, and work processes and procedures. Innovation, then, is considered an intangible resource that is very difficult to imitate. However, the main goal of KM in many organizations seems to be focused on improving the management of information and knowledge within and across enterprises [3]. KM in most organization is centered on maintaining continuity and consistency of capturing the knowledge, and publishing it appropriately to be easily and quickly used by those who require it including staff, customers and other stakeholders. This structure lacks measurement and assessment sprite in order to evaluate and improve KM efforts. It can further ineffectively be aligned with organization's goals and fruitlessly may treat with the creativity and invention process. It also leaves not much spaces for stimulating innovation which can be defined as generating drastic change in what customer perceives as value for price.

The general belief is that everything that gets measured can be evaluated, adjusted and then controlled and improved. It is, therefore, the intention of this paper to formulate a novel framework in KM equipped with the basic assessment tools. The model will give readers a new perspective in fostering creativity and stimulating innovation within their organizations in order to create value and deliver benefits. We first review invention and

innovation concept and study major drivers of innovation in Section III. Section IV describes invention, innovation and technology. Section V determines incremental and radical innovation. Section VI reviews KM current models. Section VII introduces our two dimensional KM model. Section VIII focuses on idea funnel and integrates it with the new model. Section IX studies Apple Inc. in order to illustrate the possible application of the model. In section X, we emphasize on KM leader role and elaborate on knowledge hierarchy and we sketch out the conclusion and future works in the final section.

II. INVENTION VS. INNOVATION

People normally equate innovation with creativity or invention. However, innovation is different from invention and creativity. Sloane [4] has defined these terms as follows: Creativity is the capability or act of conceiving something original or unusual. Invention is the creation of something that has never been made before and is recognized as the product of some unique insight, while Innovation is the implementation of something new.

Invention is the act of generating a device, process or discovery that is new and useful which reflects extraordinary creativity and can even make a distinct contribution to science advancement. Invention is somehow individual activity focused on internal process of an organization which can potentially result in innovation, if it is properly leaded, managed and finally commercialized. In such a sense innovation is the external manifestation of invention which has a tangible impact. It is about executing and commercializing in order to meet or exceed the customer's needs. Accordingly, creativity and innovation process is divided into five blocks by many scholars, as shown in Fig. 1).

The process begins with idea generation and opportunity recognition which happens when an insight about something new is developed. Once the idea is considered to be of value to either customers or shareholders in form of cost advantage or solution to a problem, then, it must be evaluated by decision makers to address below questions :

- What kind of value does the idea creates ?
- Is there a market for this new value ?
- Is market large enough to justify development ?
- How does the idea fit within organization's strategy ?

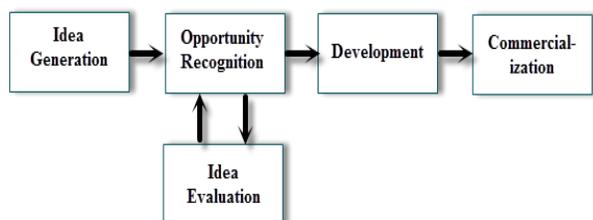


Figure 1. Innovation process adopted from [5].

Ideas that produce affirmative answers to these questions can be considered for development and commercialization

stages. Therefore, we can summarize the model to below equation according to Govindarajan [6]:

$$\begin{aligned} \text{Innovation} &= \text{Ideas} + \text{Execution} \\ &\text{or} \\ \text{Innovation} &= \text{Creativity} + \text{Commercialization} \end{aligned}$$

III. MAJOR DRIVER OF INNOVATION

The successful innovations do not come into being by benchmarking and copying. They come into being by overcoming contradictions, limitations, paradigms, by taking another view at the problem and differentiating. Differentiation can be achieved by a new design, other functions or another view at the customer need [7]. In fact, there are many drivers of innovation which include but not limited to profit and revenue growth, productivity, cost efficiencies, business or organizational model, partnership, route to market or marketing method, employee satisfaction and most importantly new products and services development.

We tend to think of an innovation as a new product; but, we can innovate with a new process, method, business model, partnership, route to market or marketing method too. In fact, every aspect of a business operation is a candidate for innovation. Some of the most powerful innovations we can make, are in business methods and customer services. If we look at companies like Dell, eBay and Amazon, we see that their great innovations were with their business models rather than in new products.

In a broader view, there is a difference between the organization's view of product innovativeness and the customers' view of the same. Firms express product innovativeness by comparing technology product content to competitor offerings and by assessing the degree of technical and marketing resources needed, whereas the customers based their evaluation of innovativeness on their need to alter mental models and behavioral habits. The key drivers and assessment tools like employee satisfaction, productivity and cost efficiency can help organizations to improve the quality, price, image and availability of products and services in order to better serve the customers. Therefore, we can say that the customer is the major driver of innovation and must be at the center of focus in all innovation efforts. Specifically, the major criteria in assessing new ideas should be in involving the customer's real requirements in entire process in order to record his or her feedback in a scorecard. This measurement tool would increase retention rate, increase new customers; reduce complaints and cost of it, reduce response time, increase revenue per customer (new or existing), increase sale volume and increase customer satisfaction [8].

We can think of Apple's iPhone, introduced in June 29, 2007 as of one of the most dynamic example of innovation which, not only changed the mobile industry, but revolutionized people's lives and the way business is done. Here, one can observe the role of putting customers and users at the center of attention and the driver of innovation. The iPhone certainly was not the first smartphone, nor was it the first phone to offer users access to their email and the

Internet. But, it introduced the touch-based user interface, which, like the mouse, changed the way people interact with their devices. This alone together with other user-friendly features made communication more simple, fun, intuitive and interactive for users.

IV. INVENTION, INNOVATION AND TECHNOLOGY

Innovation and technology are not the same, although innovation can be the result of new technology; however, in some cases innovation is based on smart redeployment or combination of existing technologies. Other important issue is that not all invention end in commercial application or useful product, since, simply there might not be market for it or even timing is not correct. For example, Ampex in the US was the company which invented video recording system; yet, JVC of Japan was the one to become successful with the VHS standard. The same is true with Netscape, the first Internet browser, which has not been the most successful one. iPhone as the most successful and amiable smartphone was not certainly the first one on the market either.

Therefore, we can observe that successful innovation must generate higher value for customers in the first step and then sustain this value in long run. Many new and good ideas can be generated within a company; yet, only those which have an internal rate of return that is significantly higher than cost of capital are called innovations. This higher rate can justify resources for stimulating innovation compared to the other alternatives and can also reward for the risks taken with innovation. In brief, a sustainable economic success can lead invention to innovation. To succeed, organizations need to build up their competencies for managing and sustaining both invention and innovation and we can think of this success by multiplying creativity to innovation, if either has a zero score then the success is zero. Apple Inc. is considered as magnificent icon of inventiveness by connecting creativity with technology in order to create value in digital-age economies. The company represented amazing products that directed and transformed seven fields i.e., personal computing, animated movies, music, phones, tablet computing, digital publishing and retail stores. Apple Inc. combined leaps of the imagination with amazing feats of engineering and became the US most admired company.

V. INCREMENTAL AND RADICAL INNOVATION

Innovations can be incremental or radical, based on the nature of knowledge and the amount of knowledge to be acquired and applied.

Likewise, every improvement in products or services can be seen as an incremental innovation which is a kind of solution for problems in current set-up. Incremental innovation exploits existing forms and/or technologies in order improve or reconfigure something that already exists [9]. Most businesses and organizations are good at incremental innovation. A radical innovation, in contrast, is

a departure from existing technologies or methods which in many occasions creates new and emerging market [9]. A radical innovation demands an entirely new approach to do or make things. As such it is often risky and challenging and requires more time and budget. Most large organizations are not so good at radical innovation.

The four types of innovation on the basis of the nature of knowledge and the amount of knowledge to applied and acquired are plotted in Figure 2.

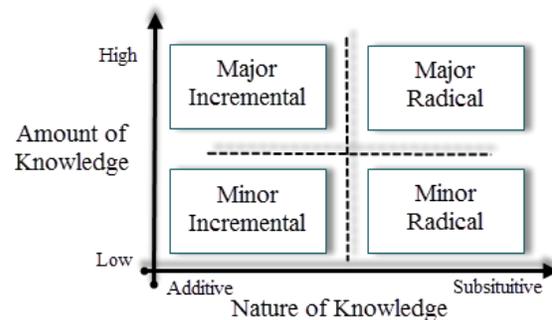


Figure 2. Innovation plot adopted from [9].

A. Major Incremental Innovation

The innovation is a major incremental if the nature of knowledge is additive that is to say there is a new thing but it is in sequence with the existing findings and the amount of knowledge that is to be acquired and applied is high [9].

An incremental innovation would build upon the existing knowledge and resources and enhance the competence of an organization. Mobile commerce, which is in sequence of developing and enhancing e-commerce can be considered in this innovation category.

B. Minor Incremental Innovation

The innovation is minor incremental if the nature of knowledge is additive that is to say there is a new thing but it is in sequence with the existing findings and the amount of knowledge that is to be acquired and applied is low [9].

An incremental innovation would involve modest technological changes to improve the existing products and/or services and sustain their competitiveness. Adding more features on existing 2010 Microsoft Office and updating its bug fixing is considered to be in this innovation category.

C. Minor Radical Innovation

The innovation is minor radical, if there is a new thing but it is in sequence with existing findings and the amount of knowledge that is to be acquired or applied is low [9]. When an organization first published its website for e-commerce and online sales that is considered a minor radical innovation for the organization since, many other websites of the same nature are already exist. Yet, the nature of sales and marketing for this particular organization is radically changed.

D. Major Radical Innovation

A radical innovation, on the other hand, requires completely new knowledge and/or resources and will be, therefore, competence destroying [9]. A radical innovation involves large technological advancements, rendering the existing products, rendering the existing products non-competitive and obsolete [9]. As in many field, a radical innovation undermines and abolishes established products and services by passing of time. For example, music downloads over the internet as a radical innovation would make music CD obsolete. Digital photography has also eroded demand for traditional photography film. Founded in 1880 by George Eastman, Kodak was one of the America's most notable company, which established market for camera film and dominated the field afterwards. However, the company has been struggling for years to adapt to an increasingly digital world before filing for bankruptcy protection on January 2012.

The big winners often are not the companies that obtain new technologies and use them to enhance existing products; rather they are the companies that understand how those technologies can be used to create better customer experiences than existing applications do and the biggest winners will be companies that learn to systematically produce one technology epiphany after another [10]. Drucker [28] said that 'Every organization must prepare for the abandonment of everything it does.'; this statement brings us to the fact that those companies who cannot keep up with innovation and technology trend will be soon out of the market. The change in the mobile phone market caused by iPhone has most severely affected Nokia and Sony Ericsson which used to sell quality and affordable feature phones. Apple dared to be different and innovator by offering unique features. While more expensive than many alternatives, iPhone is wildly popular with low return rates and high user satisfaction levels.

To sum up, it is presumed that creativity should be incorporated in daily work of the organization where everybody is encouraged and rewarded to generate new ideas again and again. The aim should be to build up a climate where innovation is stimulated and sustained in both dimensions, i.e., the amount of knowledge and the nature of knowledge as a culture.

VI. KM CURRENT MODELS

KM has fueled the creative process of many companies like Google, Microsoft and Apple Inc. as it is an intricate weaving of knowledge by collecting, storing, sharing and finally putting it into practice. KM activities must have a conceptual framework to operate within in order to ensure that they will be coordinated and produce the expected KM benefits [1].

Many KM models represent a holistic and comprehensive perspective (i.e., they are comprehensive and take into consideration people, process, organization and technology dimensions [1]. We review the most known models here.

Weick [23] proposed a theory of sense making to describe how chaos is transformed into sensible and orderly processes in an organization through the shared interpretation of individuals. He claims sense making consists of four integrated processes, i.e., ecological change, enactment, selection and retention. Nonaka and Takeuchi [24] studied how knowledge is produced, used, and diffused within an organization and how such knowledge is contributing to the diffusion of innovation. Wiig [23] focuses on the three conditions that need to be present for an organization to conduct its business successfully: it must have a business (products and services) and customers for them, it must have resources (people, capital, facilities), and it must have the ability to act. von Krogh and Roos [26] distinguished between individual knowledge and social knowledge and took an epistemological approach to managing organizational knowledge: the organizational epistemology KM model. Boisot [22] distinguished information from data and emphasized that effective movement of information goods is very much dependent on senders and receivers sharing the context and same coding scheme or language. Choo [25] has described a model of knowledge management that stresses sense making, knowledge creation, and decision making. The model focuses on how information elements are selected and subsequently fed into organizational actions.

Bennet and Bennet [21] described a complex adaptive system approach to KM and believed that the organization can be viewed as a system which is composed of living subsystems that combine, interact, and coevolve to provide the capabilities of an advanced, intelligent, technological, and sociological adaptive enterprise.

Despres and Chauvel [16] suggested that four dimensions cut across KM field:

- Time: referring to a linear and simplified representation of cognitive process, including the (a) mapping, (b) acquisition, (c) codification, (d) storage, (e) application and (f) transformation of knowledge or its elements.
- Type: referring to tacit and explicit knowledge
- Level: referring to different levels of social aggregation.
- Context: referring sense-making, in that no knowledge element has any meaning outside of a given context.

Meanwhile, they concluded that seven major clusters of activity are currently active in KM and the majority of behaviors and practices associated with KM may be located in this classification.

- Business intelligence;
- Benchmarking;
- Data warehousing;
- Groupware/virtual teaming;
- Communities of Practice;
- Innovation/synergies, Creativity, and
- Learning/Competencies/Employee Development.

VII. INTRODUCING PLA MODEL

In fast-moving world, most organizations rely on their ability to consistently deliver new and improved products and services to their audiences. KM managers have a pivotal role to play in helping their firms to become more innovative [11]. Indeed, creativity and innovation are at the cutting edge of KM, although there is generally lengthy time span between development of the new knowledge and its transformation into commercially viable products and services. Most company's innovation efforts start with ideas and brainstorming sessions which are nothing more than a one dimensional approach. More importantly, it ignores the organizational capabilities and lacks the assessment tool whilst reducing innovation chance of success.

The basic model of KM, on the other hand, lacks the measurement and assessment spirit in order to analyze, adjust and improve KM outcome. The model is too general to align with organization's goals and treats ineffectively with the creativity and invention process. Therefore, this KM approach leaves not much space for fostering creativity and stimulating innovation. As the saying goes everything that get measured can be evaluated, adjusted and then controlled and improved. There is an old saying that what gets measured gets managed.

In today's global business organizations need to integrate the measurement and management of company's tangible assets with the assessment of knowledge assets. On the other hand, Invention and Innovation are extremely dependent on the availability and richness of knowledge; therefore, we developed a new approach for planning, leading and adapting new ideas and integrate it into KM classical model, as shown in Fig 3. We name the model PLA (Planning, Leading, Adapting), which enables us to have a closed loop. The model tries to measure and assess the whole process in order to foster creativity in the first two steps of capturing and storing and then stimulate innovation in the second two steps of disseminating and implementing.

	CREATIVITY		INNOVATION	
Planning	Capture and Generate	Store and Structure	Analyze and Disseminate	Implement and Extent
Leading				
Adapting				

Figure 3. KM Framework for fostering creativity and stimulating innovation.

Planning: Refers to the policies, methods and logic formulated for steps 1 through 4 of classic KM model in order to meet and exceed current and future customer's perceived value. We need to accurately describe the whole KM model and shall consider where to begin, how to structure, which people should participate and how they should be trained (assembling team). In this phase, we delineate the objectives and boundaries of our KM system in terms of scope, time and budget. This is mainly focused on defining our customers and their requirements as well. The

goals and/or objectives of KM system are then set based on the customer's current requirements and future expectations. At this stage, as shown in Fig. 4, we form a brainstorming team of creative thinkers in the community

Leading: Refers to the extent to which and how well the company execute steps 1 through 4 by creating the required environment and sustaining invention and innovation capacity and capabilities in order to implement policies and methods formulated in planning stage. It also involves defining the indicators to monitor and measure success level for each step of classic KM model and then quantify it. To measure KM success, we first develop a data collection plan and document the steps we intend to quantify. We will then select our metrics and key performance indicators and then conduct data collection and measure the indicators. At this stage, as shown in Fig. 4, we allow new ideas to be evaluated by selected groups of community and/or potential customers.

Adapting: Reflects on the assessment of planning and leading processes to ensure the right modifications for effective execution of KM steps in order to adapt the whole approach for engaging and responding to customers and stakeholders. This step focuses on the indicators to reduce the gap between the current performance of system versus the desired goal. KM systems need to find new ways for doing things better, cheaper and faster. Adapting also ensures that performance improvement remains at the desired level. We institutionalize this by modifying policies, procedures and incentive system. We can plot these modifications on a small scale to determine their sustainability and then implement them on a wider scale. In this stage as shown in Fig. 4, we build another team of selected experts to put ideas into practice.

VIII. IDEA FUNNEL AND PLA

The process from idea generation to market place is challenging and demands systematic assessment since many ideas - if not most - are either technically unfeasible, too expensive to implement or simply not appealing to the customers. The idea funnel is a metaphor to eliminate unpromising ideas at early stages in order to avoid wasting time and resources. The funnel has wide mouth into which all ideas are poured and a few of them pass towards marketplace while the funnel narrows by the criteria which are already defined. While aggregating PLA approach into idea funnel, we can observe that planning is bold at the entrance of funnel which demands most of time and resources should be spent in formulating a plan at the beginning. Then, the ideas are leaded and screened according to the criteria set by the organization and pass through for evaluating and finally adapting to the customers' or potential customers' requirements. The diagram highlights the fact that as ideas pass through the funnel the center of attention will be shifted from planning to leading and then adapting. The same is true in KM framework of Fig. 2 in which more attention to be given to planning and leading in the first two steps of KM whereas, in the second two steps the emphasize is on adapting.

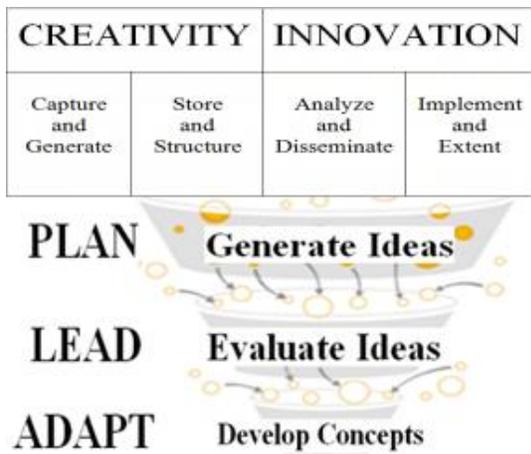


Figure 4. Idea Funnel integrated with PLA approach.

IX. CASE STUDY - APPLE INC.

Apple Inc., incorporated on 1977 by Steve Jobs and Steve Wozniak, designs, develops, and sells consumer electronics, including computer software, personal computers, tablets and mobile phones. Apple achieved widespread success with iPhone, iPod Touch and iPad products, which introduced innovations in mobile phones, portable music players and personal computers respectively. Apple closed at a record share price of \$665.15 on August 2012 reported by CNBC and became one of the most profitable companies on the Earth. In the same month, it had a market capitalization of \$622.98 billion which was the highest nominal market capitalization ever reached by a publicly traded company. Apple's success story and astronomical growth stems from the mastery of several areas including, but not limited to, creativity, innovation, supply chain management, knowledge management, and operations.

We believe that KM is the core competency of Apple Inc., which is manifested in its corporate culture and engaging in the innovation value processes to capitalize on new market space and providing an understanding of predictive markets, finally translates into amazing products and the brand loyalty of customers. Apple's culture and knowledge-sharing initiative, implanted by its great pioneer late Steve Jobs when he created Apple University to assure continuity of his vision. He hired Yale and Harvard academics to teach the company's history to Apple executives, and he commissioned internal and external "case studies" to prevent managers from repeating strategic errors [12]. This initiative is fairly new and is not easy to measure its influence on the company's innovation and success story, yet it proves the commitment of Steve Jobs to manage knowledge flow within the company.

Contrary to current business trends toward transparency and flatter hierarchies, Apple Inc. has fiercely encouraged secretiveness, silos and a start-up mentality and Apple's marketing campaigns resists imparting information and actively seeks to protect it [13]. Despite all these and the lack of first hand data of what exactly is happening inside

Apple Inc., we observed the external manifestation of Apple innovation and focus on its strengths in knowledge management and try to evaluate this with our proposed KM model in this section.

A. PLANNING in Apple

Apple had formulated solid polices, methods and logic to create and collect knowledge through different source including staff, customers and stakeholders. It further constraint its secrets so there have been limited leaks whereas data were distributed among design teams, selected suppliers and premium customers for further studies. Apple also had the ability to constantly change its structure and goals with new information in order to meet the customers' requirements by targeting six industries including personal computing (with Apple computers and laptops), animated movies (through Pixar, which pioneered computer animation), music (through the iTunes Store and the iPod), phones (with iPhone), tablet computing (with iPad), digital publishing and retail store (by opening Apple own physical store).

B. LEADING in Apple

In leading stage, Apple stimulated creativity and fostered invention and innovation capacity and capabilities and came up with the grand vision that the personal computer should become a "digital hub" for managing all of a user's music, videos, photos, and content. Apple, thus, got into the personal-device business by designing and selling collection of finest products in respective six industries that are iTunes music store in April 28, 2003, which had over 40 billion downloads before Xcode introduced. In January 2007, Apple introduced the iPhone and sold 37.04 million in Q1 this year alone. Apple TV, iPod touch, and iPod classic introduced as well. iPhone 3G in 2009, iPad in 2010, which became the number one selling tablet to date by having half of the market share. In 2008, MacBook Air introduced, worlds slimmest computer at the time iPhone 3G introduced. In January 2010, Apple introduce the iPad, the number one selling tablet to date which still owns more than half the market share. Apple also set up its own direct-to-consumer product distribution service, first with the online Apple Store, which handled \$12 million in sales in its first month of operation, and then with Apple retail stores in high-end, prized locations. Steve Jobs brought his famous attention to detail to every design aspect of Apple's stores, including the shelving, flooring and lighting [14]. In 2010, Apple came up with the successor strategy—the "hub" would move to the cloud—and Apple began building a huge server farm so that all a user's content could be uploaded, and then, seamlessly, synced to other personal devices [12].

C. ADAPTING in Apple

Apple constantly assessed the former stages to ensure the right modifications for effective execution of KM steps in order to adapt the whole approach for engaging and responding to customers' and stakeholders. Apple would never release any new product unless its designers and engineers had successfully answered his favorite question,

“Will this help the purchaser?” [14] Apple also ensures continuous improvement in overall performance in delivering the right goods and/or services to the customers. This happened when Apple introduced the original iMac. The device was quite useful for managing a user’s photos and videos, but it was left behind when dealing with music. People with PCs were downloading and swapping music and then ripping and burning their own CDs and the iMac’s slot drive couldn’t burn CDs [12]. Apple created an integrated system that would transform the music industry instead of upgrading the iMac's CD drive. The result was the combination of iTunes, the iTunes Store, and the iPod, which allowed users to buy, share, manage, store, and play music better than they could with any other devices [12]. After the iPod became a huge success, Apple explored all possible reaction of competitors and learned that mobile phone maker might add music player to their handsets. So, Steve Jobs cannibalized iPod sales by creating the iPhone. “If we don’t cannibalize ourselves, someone else will,” he said [12].

X. KNOWLEDGE HIERARCHY

Reviewing Apple case study pointed out an important role of its founder, Steve Jobs that, we believe, acted as a KM director and leader to nurture creativity and foster innovation. Visionary leaders as Goleman [19] discusses can see the far-flung consequences of local decisions and imagine how the choices they make today will play out in the future. Jobs was the one who saw the commercial potential of many innovations in computer, music and mobile industry, well ahead of anyone else. That is why he has been described as the "Father of the Digital Revolution" [17], or a "Master of Innovation" [18]. The case also illustrated how Jobs created an environment where a clear vision of KM leader challenged the people to deliver and break out of their traditional thinking patterns. The other important issue as indicated by Dugan and Kaigham [20] is that breakthrough innovations, by their very nature, do not lend themselves to consensus. Most of innovative products developed by Apple Inc. dazzled and jumped off the page because Jobs himself played a significant role as KM leader and director who had visibility into and the authority to define and select projects while reallocating and reprioritizing resources.

As such, we add the 5th level in Data-Information-Knowledge-Wisdom hierarchy (DIKW), which was introduced by Russell Ackoff in his address accepting the presidency of the International Society for General Systems Research in 1989 [29]. Perspicacity as Indicated in Table I. is the gift of seeing and understanding people, things, or situation intelligently far ahead of others and setting trends to reshape specific sector and push value to the relevant part of the eco-system.

TABLE I. REVISED KNOWLEDGE HIERARCHY

TYPE	Definition	Purpose
PERSPICACITY	The gift to see and understand people, things, or situations intelligently and setting trends.	Prediction, Intuition, Sixth Sense, Inspiration
WISDOM	Knowledge of what is true or right coupled with good sense, judgment and expertise.	Decision Making, Creation, Innovation
KNOWLEDGE	Information in context to make it insightful and relevant for human action.	Production, Development, Improvement,
INFORMATION	Data placed into a form that is accessible, timely and accurate.	Storing , Accessing
DATA	Raw facts, figures and records contained in a system.	Capturing, Processing

XI. CONCLUSION AND FUTURE WORK

This paper has explored the convergence of knowledge management and creativity and innovation. The proposed framework and model tries to promote the continuous quest of the business community to describe two of the most important resources of sustaining and developing the business of a company - creativity and innovation. Developing and bringing to market innovative products ahead of competitors can generate various benefits in economic, preemptive, technological and behavioral factors. [15].

We argue that the proposed model builds new insights into the role of knowledge management systems in knowledge-intensive organizations for fostering creativity and stimulating innovation. We further highlighted an important role of KM director and leader who employs perspicacity to see, understand and recognize things and situations that are beyond the realm of normal expectations in science and technology to guide and direct innovation trends. We believe that implementing a successful KM system to foster creativity and stimulate innovation in every organization requires adopting a multidisciplinary perspective, encompassing issues of strategy, structure, systems and human resource management. This requires more detailed analysis on successful cases in order to develop KPIs to bridge the gap between goals and results in KM which is beyond the scope of the present paper. We hope that the idea of formulating a two dimensional model for directing and leading KM process will generate interest for further research in this area.

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