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Title:- A Pragmatic Study of Managing Innovation And Technology As A Sustainable Competitive Advantage- A Top Management Perspective.

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A PRAGMATIC STUDY OF MANAGING INNOVATION AND TECHNOLOGY AS A SUSTAINABLE COMPETITIVE ADVANTAGE- A TOP MANAGEMENT PERSPECTIVE.

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Abstract— In today's rapidly changing marketplace, unarguably the top management need to manage innovation and technology to sustain the market competition and be the market leaders. Technology plays a major role in making the innovation process operative and more effective. Consumer buying behavior is changing due to the easy access to information with a click of a mouse, hence it is imperative that companies should innovate continually for gaining competitive advantage. Recent study shows that organizations are not consistent in their innovation management. The study aims at top managements role in inducing the innovation culture in the organization and marketing the idea/ product or services tenaciously to the smart customers. The research analyzes the ways in which the top management can effectively set a system where innovation becomes responsibility for all entities working in the organization, rather than limiting innovation to a certain department or people and implement the ideas for gaining competitive advantage, to survive and succeed.

Keywords— Innovation Management, Technology, Top Management, Competitive Advantage, Organization.

I. INTRODUCTION

Innovation is a tool by which an organization can add value and create competitive advantage for itself. The process of innovation heavily depends upon the capability of the management in its implementation. As its dynamic and changing rapidly both in outcome and process, it provides more challenge to the management for managing the changing innovation process. The value creation activities of the firm are linked with suppliers and customers, and all the technological activities in the firm are directed by increasingly coherent and effective innovation strategies. The top management role in integrating technology with innovation can secure profitable prospects for the company.

II. OBJECTIVE OF STUDY

This section includes description of the specific objectives and that would together achieve the overall goal of the research as follows:

i. To identify the importance technological innovation trends for the survival of organization.
ii. To analyze the reason for organization getting succumbed to rapidly changing technology
iii. To assess the effectiveness of top management in making innovation as organization culture
iv. To determine the correlation between innovation culture and employee's motivation
v. To formulate plan for top management for managing innovation and technology.
vi. To analyze factors that are essential for successful innovation activity.

III. LITERATURE REVIEW

Existing literature have provided several insights into types of innovation, innovation concepts and trends, and how company manages innovation and technology.

"Dedicated innovation systems to support the transformation towards sustainability: creating income opportunities and employment in the knowledge-based digital bioeconomy", Pyka, A., Journal of Open Innovation: Technology, Market, and Complexity, December 2017, 3:27 [1]

The research highlights the transformation of companies towards sustainability. Knowledge-based bio- economy and digitalization are two promising technological approaches which will contribute tremendously to the transformation and trigger the required technological dynamics. However, such a broad transformative process requires a participation of all societal stakeholders. The researcher introduces the idea of a Dedicated Innovation System, which takes care of potential inertia due to the interest of established (oil-based) industries and consider the economic opportunities raised by social and responsible innovation. To steer the transformation successfully, organizations needs to emphasize on different types of innovation, which includes besides technological, also social, political and ecological innovations. Furthermore, innovation systems theory has to be extended to capture the particularities of technological and social innovation as well as normative issues applicable to industrialized as well as developing economies.

"Innovation systems research: an agenda for developing countries", Abiodun Egbetokun, Adekemi Jessica Oluwadare, Blessing Funke Ajao and Oluseye Oladayo Jegede, Journal of Open Innovation: Technology, Market, and Complexity, December 2017, 3:25 [2]

The paper takes an objective look at the innovation systems approach and studying innovation systems in developing countries. The research shows that the trend of Google Scholar articles on innovation system published between 1982 and 2013.

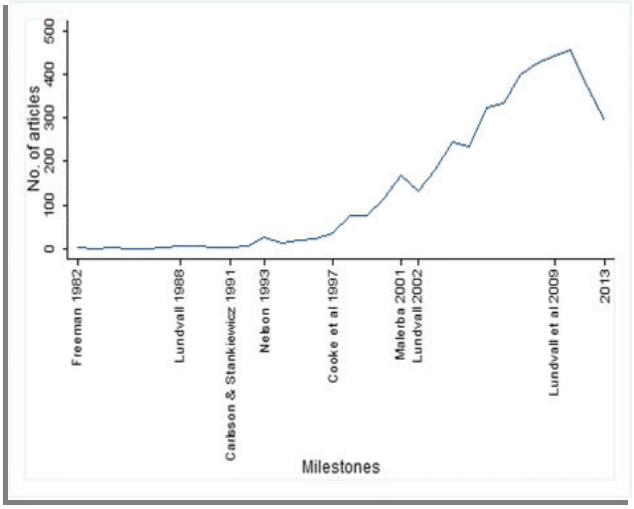

Fig. 1 Trend of Google Scholar articles on innovation system published between 1982 and 2013

The rising slope of the curve suggests that from a modest beginning, the study of innovation systems grew rapidly reflecting the interest of scholars towards the topic. Another importance aspect highlighted in the paper is informal interactions in the innovation system. Previous studies have narrowly focused on formal interaction as the only possible form of interaction within the innovation system. The study further argued that the informal sector ought to be included as a major actor in the innovation system owing to the strategic role it plays in employment, production of goods and services, and their immense contribution to economic activity in developing countries. Another, pitfall in the innovation system approach addressed in the study is the aggregation of actors and stakeholders. Actors within each element play different roles; therefore, interaction among broad range of actors across element smears the defined analysis of the innovation systems theory.

The study concluded by proposing that for innovation systems theory to remain relevant in the near future there has to be a shift from systems to networks, i.e. network of actors within same element and across elements.

The research describes the factors that motivate and shape innovation efforts in an economy require a suitable environment in which to interact successfully.

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"Innovation decision of Tunisian service firms: an empirical analysis, Hanen Sdiri and Mohamed Ayadi", Journal of Open Innovation: Technology, Market, and Complexity December 2016, 2:18 [3]

In this paper, a sample of 108 Tunisian service firms were studied for explaining the extent to which the service firms make their decision to innovate. The paper reveals that the two-stage model has a statistically significant advantage in predicting innovation. The robustness of two decision-making models were tested. The purpose of the paper is twofold. First, it investigates the way by which Tunisian service firms make their decision to innovate: simultaneously (one-stage model) or sequentially (two-stage model). Afterwards, once the innovation-making-decision way is selected, the paper analyzes its main determinants. Tunisia, considered as an emerging country, has devoted a remarkable endeavor to service innovation. The program called "Pour la Tunisie de demain"3 has been adopted to support Tunisian service firms to avoid foreign competition. The program has called for the encouragement of innovative companies, the intensification of the cooperation projects, the implementation of several techno-parks and the establishment of the information society bases. Indeed, it is shown that the sequential model illustrates well the innovation making-decision procedures. In fact, the main determinant behind the dominance of the sequential model is the importance that service firms give to the innovation objectives.

IV. RESEARCH METHODOLOGY

The research is based on a qualitative method to provide insights about the ways organizations value and process their innovation system. Information have been collected using theoretical, contextual and descriptive data. Books and Journals and websites have been referred to find the information regrading effect of innovation on companies' success, management's role in implementing robust innovation system.

V. CONCEPTUAL FRAMEWORK

Research suggests that 88% of the Fortune 500 firms that existed in 1955 doesn't exist anymore as some have either merged with other companies, or some gone bankrupt, or not recognized or have fallen from the Forbes list of top 500 companies [4]

A. Success stories of innovative company

Exhibit i: **Top 10 Most Innovative Companies**

Innovation executives we surveyed votes overwhelmingly for Apple, Google, and 3M as the most innovative companies. Votes for the next seven were much more modest.

		R&D Spending 2009 $US mil.	Rank	Sales 2009 $US mil.	Intensity (Spending as % of sales)
1	Apple	$1,333	81	$42,905	3.1%
2	Google	$2,843	44	$23,651	12.0%
3	3M	$1,293	84	$23,123	5.6%
4	GE	$3,300	35	$155,777	2.1%
5	Toyota	$7,822	4	$204,363	3.8%
6	Microsoft	$9,010	2	$58,437	15.4%
7	P&G	$2,044	58	$79,029	2.6%
8	IBM	$5,820	12	$95,759	6.1%
9	Samsung	$6,002	10	$109,541	5.5%
10	Intel	$5,653	13	$35,127	16.1%

Source: Booz & Company

Fig. 2 Top ten most innovative companies [5]

Apple's Innovation System: Apple is #1 innovative company in the world. The company innovated significant new products like iPod, iTunes, iPhone, and iPad. Innovation is a culture in Apple rather than a process. Its competitors are not able to match the innovative product offering. The success of Apple lies in its strategy of hiring capable innovators, who are creative minded, kindle new ideas, and produces the best product offering competitive edge to the company. [6]

Google: Google has ranked many times among the most innovative companies in the world. Google has a curious innovation culture, where all staff proactively keep looking for innovation and technology adopted by other companies in same industry. It has a process of systematically utilizing the ideas with the changes in technology and implement at right time. The management supports unconventional ideas which can either come

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from top down or bottom up, leading to radical innovations. One of the example is self-driving car which was invented by Google engineers and not the automotive industry. [7]

B. Study of Some Companies That Fail to Innovate

- Kodak: Despite having early access to digital camera technology, the company misjudged digital photography, hence failed to embrace the transition to digital led, leading to bankruptcy.
- Blockbusters: Even with six CEOs, the company went bankrupt as none of them could focus and envision the proposal of Netflix. The CEO refused the offer of Netflix to buy their company as he thought that it was a niche business. The company was not able to do the transition towards a digital model.
- General Motors: In spite of being the largest company in the world, General motor also faced bankruptcy because the company failed to innovate and ignored competition.
- Nokia phone: Could not understand and compete with the emerging trend of smartphones.

If the above companies would have realized the potential of new technology, it could have developed products based on market needs and demand. The misjudgement of emerging trends of innovation by these companies lead them to its demise. This represents that companies in every sector should be alert and be open to innovation or be ready to face failure. The key lesson that the management can learn from such companies is that the failure to innovate leads from Fame to Defunct. Managing innovation and adapting to the emerging market trends are key responsibilities of the management. The practice of high order thinking by all workers and implementing continuous innovation process will secure the company future.

C. Reason why Innovation fails.

Studies show that around 60 to 80% of new products fail [8]

Finding out the reasons for the failure is valuable knowledge, as the company can ensure not to repeat the mistake set the right measures and accents in innovation management for significantly increasing the chances of success of innovations.

Some of the most common factor for failure as follows:

- Idea Selection: insufficient information for decision making
- Innovation Strategy: lack of strategy and process for decision making.
- Decisions made on staff belief: Top management makes decision based on their belief, rather than facts.
- Less priority to innovation: although management is aware of the importance of innovation still, day to day business occupies most important part of agenda and unfortunately innovation plans are not implemented and remains a slip service.
- Commitment: As everyone cares about the day to day business, management,
- Wrong customer need analysis
- Sluggish process

VI. FINDINGS

The findings indicated that the role of management in managing innovation and technology differs based on the size of the organization. The small firms are more organized than large firms as they have Managers, who qualify in multitasking, such as one person can handle, finance, marketing and technical part of the project. Hence, they can view the overall scenario due to their knowledge of various field and be more efficient and flexible. Due to the few layers of management, the innovation process is better streamlined and the small companies are able to do more radical innovations. In contrast, large organizations have multi layered management. As the volume of production and distribution is more, they are less flexibility for accommodating rapid changes. The culture of the organization is more disciplined and focused the current business. There is usually Scientific Research or Research and development department which is responsible the innovation. Top management's perspective and approach is very important for the large organization to prepare them to be the innovative leaders. The research analysis of

current trend of innovation, top management approach to innovation and change in technology, obstacles faced by companies in responding to rapidly changing technology and facing fierce competition in innovation and the factors essential for the success of innovation is discussed below:

i. Trends of technological Innovation

It is imperative for the organizations to stay abreast of technology innovation. From artificial intelligence (AI) to the Internet of Things (IoT) and augmented reality (AR), below are the top tech trends in innovation and technology:

Artificial Intelligence (AI): It refers to the programming of machine which enables them with the intelligence to think and work like human brains. It recognized human speech and can help in problem solving, planning and organizing. Amazon Alexa is an example of AI. Many researchers are finding about the benefits and risks of AI.

Augmented Reality (AR) And Mobile: Telecommunications companies are offering lightning-fast 5G functionality for smartphones, a great boon to mobile employees who need to stay connected to work. AR technology will take advantage of the enhanced mobile experience to immerse users and keep them connected at the same time. AR will become the "next screen" for marketers to provide new experiences. From interactively trying on clothes or touring hotels or data centers, customers will have the chance to interactively experience products and services in real time without being in a store.

Internet of Things (IoT): IoT-connected devices are one of the biggest trends in 2018. Any object or device like vehicles, home appliances, electronics, software, which can sense and collect data, gets connected to the internet, and sense and collects data to be sent to internet. E.g. In marketing it provides more opportunities for interactive marketing. Smart cities and automated transportation is another example of IoT.

Robotics: Robots are programmed in a way where they can perform the regular repetitive task that human does. will become even smarter, making them more efficient and better able to work with humans. They would have the ability to replace retail work, manufacturing and more.

Drones: Machine learning and AI are the big focus for drone technology innovation in 2018. Drones can gather information for a variety of industries, saving man-hours and their associated cost.

ii. Top Management role in managing innovation and technology

Vision: It is imperative form the top management to see the emerging challenges that a company might face in future. This vision and knowledge will prepare them to face the accelerating pace of change and adapt to it.

Commitment: As innovation is a long-term planning and it takes several years to produce the successful outcome, a consistent approach and perseverance from the top management plays a vital role in the process. The commitment of leaders inspires other employees in the organization to continue their endeavor to innovate.

Innovation Culture; People interpret innovation in various ways. It can hold various meaning to people associated with the organizations. Hence it is very important for the top management to clearly define innovation and articulate the purpose which will help them to create innovation culture in the organization.

Working environment: To set up a culture in the organization for innovation which inspires the creativity of employees. working environment can make an innovation succeed or fail. "Where ideas are critical it is up to

management to address cultural differences. By dissolving internal barriers, such as between blue- and white-collar workers, ideas can flow. Innovation can only happen when there are opportunities." And the best way to achieve this, he believes, is through manager coaching.

Problem identification: Top management viewpoint on understanding the problem as an opportunity rather than failures, provides a strong base for the employees to take risks without hesitation and there is high possibility of producing big breakthrough ideas.

Effective knowledge management: The top management's perspective in having a culture of open communication and effective knowledge management system to set up the best practices and insights across the organization, where members can share knowledge with each other and contribute to the successful innovation.

Teamwork: People from all departments should contribute equally and efficiently for high order thinking.

Promoting motivation: The management can have an incentive system for the staff who are actively participating or have come up with ideas that are profitable to the company. The incentive reflects the importance of the innovation and motivates the staff to think about innovation.

Appreciation: All ideas coming from the employees should be recognized, appreciated and valued.

Resources & Training: employees should be provided adequate training innovation management and the management to ensure that there is adequate resources for implementing the ideas.

Tracking and monitoring the innovation process: Rigorous follow up on the tracking and the progress of innovation by top management can provide positive results.

Performance Appraisal: Top management should be appraised on their leadership skills of implementing innovation in the organization in the long run.

Creative employee: The creativity of employees is one of the most important resources in the development of groundbreaking ideas. Hence, employees should be given the platform and the freedom to express their creative ideas.

iii. Correlation between employees and innovation

The research found that innovation is directly related to commitment of the management and employees. The organizations which have more committed staff tend to achieve greater success. The managers of committed organizers, acts like the coach and provides feedback to employees and mentor them to achieve the goals. The employees gets more authority and confidence to make decisions, without the fear of making mistakes. The rewards and recognition from the top management, keeps them motivated and provides them with the sense of fulfillment. The study also showed that the right managers are much more important motivators than working environment, incentives, or economic benefits. A companywide shift toward innovative thinking causes a ripple effect and employees begin to see possibilities and opportunities for improvement where they weren't looking before. Innovation inspires thoughtfulness, efficiency, and positive change at every level of the organization

iv. Essential factors for successful innovation management

Research findings suggested that the linear model of innovation has proven to be a fallacy

of the process. Innovation should be a responsibility of one department. It will be sheer waste of resources if people at different level will not have adequate knowledge or based on their expertise, they feel the need to change or there are possibilities of not able to implement the idea efficiently. During the study of successful innovative company, it was found that the if the staff interacts with each other throughout the innovation process, they will be able to closely monitor the innovation process, identify the problem earlier and fix it on time, leading to minimizing the risk of failure. It is also mandatory to interact and keep track of the external organizations and competitors can be major source of ideas and provide data required for analyzing market trend. Technology plays a very important source of data and is used by many companies recently, sch as Apple and Google to be number one in the market, hence it can be an important source of innovation.

VII. CONCLUSIONS

Hence, from the above study, it can be concluded as follows:

i. Meeting customer expectation

The shoot through in technology and innovation by the successful companies are changing the customers' expectations and decision-making process. The radical shift in technology has created a fierce competition where many companies who are not able to keep up with the trend of innovation and technological changes in the market are struggling to survive. The availability of information on the internet and Social media are making consumers wiser and smarter. It is a challenge for the top management to control data, prepare and constantly improve the business model and continually innovate for gaining market share and thrive.

ii. Managing innovation

As innovation provides leading factor for sustained competitive advantage and business growth, the firm should focus on managing the innovation. Due to the rapid change in technology, organization are concentrating heavily on technological innovation. While many researches have been conducted on various initiative, success and failures of organization in their endeavor to innovate. All the result directs towards the management of innovation in the organization and the perspective of top management in utilizing it as a competitive advantage for sustaining in the market. As innovation and technology, the top manager must understand the vital role and various tools that can be used by them to incorporate innovation as a culture in the organization rather that a responsibility on a certain department.

iii. Adapting new technology

Successful Innovators should integrate their operations with the technological changes in the industry. The top management should continually look for dynamic technological changes in the market, whether in product or process for proving the better product/ services to the customer that its competitors. Management of Innovation and technology can provide enormous opportunity to the top management for the success of any firm or business.

iv. Organizational Culture

The culture of the organization should motivate every staff to be responsible for innovation, they should get freedom to express the ideas irrespective of the position held in the company, and the work environment should be able to enhance the implementation of the ideas. Management style should have reduced autonomy. Attract and retain intelligent, high order thinking, highly motivated, empowered staff and organizing them in coherent and cohesive workgroup. Good management encourages staff to participate and develop a culture, where innovation is embedded as a daily consistent practice in the organization.

v. Top Management perspective

The success of innovation depends upon the innovation culture in a company. Top Management perspective and approach plays a key role in setting up the process. If the top management/leaders present themselves as coaches, delegate authority of decision-making, keep track of innovation, give regular feedback, value ideas of their employees, motivate employees with incentive and appreciation, the innovative ability of the company will increase significantly and provide a tool for management for sustainable growth and profitability.

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