Information Technology for Competitive Advantage through Innovation and Differentiation

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Information Technology (IT) is being used extensively starting from plain data processing to the highest level of business intelligence. The organizations, too, have evolved their business operations in light of enhanced Information Technology capabilities and are not merely viewing information as a facilitator in decision making but also utilizing this information to achieve competitive advantage.

Information Technology is acting as key enabler for organizations in adopting competitive strategies and helping them in embracing unique features being valued by customers. Organizations are utilizing true potential of Information Technology to introduce top quality features in their products and services and in turn creating a niche market for their products and services at premium prices.

This research paper aims to understand the contribution of Information Technology in creating competitive advantage for organizations through innovation and differentiation.

Key Words: *Competitive Advantage, Information Technology, Innovation, Differentiation*

INTRODUCTION

The role of Information Technology was elevated to planning and strategic roles in strategic information systems era. The capabilities of Information Technology were used to increase the competitiveness of the organizations by changing the ways they conducted business. Information Technology was entrusted with the job to understand and facilitate implementation of strategies and in turn achieving the objectives for organizations. Information Technology looked at the strengths and weaknesses of the organizations and also at the external opportunities and threats present in the competitive environment. The organizations using Information Technology for strategic information coupled with intellectual knowledge were identifying early opportunities and preventing possible threats (Porter, 1980).

The competitive advantage is represented by implementation of an effective strategy, which is not replicated by present or future competitors simultaneously thus preventing the advantages of strategy from reaching present or future competitors (Barney, 2012). Further, sustaining competitive advantage entails maintaining its existence successfully after the efforts for duplicating this advantage cease (Barney, 1991).

Organizations treat competitive advantage as the concentration point of strategy. Organizations tend to develop capabilities of differentiating themselves against their competitors to create favorable propositions among their customers. Their focus is to create the impressions of creating more value than their competitors among the customers. The sustenance of competitive advantage of an organization is largely dependent on the magnitude of the difference the organization creates than its competitors. An organization can survive and enjoy long term growth by carefully exploiting its competitive advantage (Powell, T. C. & Dent-Micallef, 1997).

Information Technology can be instrumental in creating a distinct competitive advantage for an organization and improve its position among its competitors (Dehning & Stratopoulos, 2003).

Information technology influences effectiveness of processes in an organization and helps in creating sustainable competitive advantage. Therefore, there is a need for understanding and assessing impact of Information Technology on processes of organization for long term value creation (Tabb, 2006).

Information Technology has contributed in changing the ways the processes of organizations are conducted. Information Technology has helped organizations in creating effective relationships between employees and customers (Strebinger & Traiblmaier, 2006).

Information Technology (IT) is capable of enabling efficiency and should thus generate reasonable returns on investment, thereby visualized as enabler of strategic competitive advantage. A quick glimpse on portfolio encompassing best products, superior customer service, lower cost than rivals, proprietary manufacturing technology having shorter lead times in developing and testing new products can throw adequate light on competitive advantage. Besides, using IT effectively can help organizations in gaining and sustaining competitive advantage (Jung, Valacich, & Schneider, 2010).

With growing competition, organizations have started visualizing increasing use of IT as a strategic necessity. IT produces positive impact in performance of organizations while positively influencing profitability, market share, value etc and negatively influencing cost of operation, time to delivery, delays and holdups etc (Khong, Sing, Binshan, & Uchenna, 2010). A number of studies, too, have revealed positive impact of IT on generating competitive advantage (Chao, C. & Chandra, 2012; N'Da, Robin, & Tribunella, 2009).

Potential of Information Technology can produce sustainable competitive advantage through their indirect effect towards development and leverage of organizational capabilities (Zhang & Lado, 2001).

Established organizations have been facing stiff competition from start-up organizations demonstrating high agility on global scale. To make matters further intriguing, technological advancements fuelling pace of globalization, increasing rivalry among competitors and ever increasing customer demands are also contributing towards need of achieving competitive advantage by the organizations. The organizations need to develop specific capabilities of sensing and responding quickly to competitive challenges for achieving competitive advantage (McAfee, A., and Brynjolfsson, E. 2008; Sambamurthy, V.; Bharadwaj, A.; and Grover, V. 2003).

Organizations are creating specific IT capabilities and competencies with the help of IT applications (Bhatt and Grover, 2005; Vogel, 2005). Organizations are aligning key business processes and practices with their IT capabilities in generating internal efficiency, reducing cost and handling redundancy of non valued processes. A research study conducted on IT executives concluded that competencies and capabilities of IT are responsible for significantly affecting competitive advantage of an organization (Vogel, 2005).

INNOVATION AND INFORMATION TECHNOLOGY

Organizations use their IT capabilities in identification and creation of new products or services and also assist in developing niche markets to support planned growth while reducing time to market and cost through innovative product/service modeling. In addition, these IT capabilities may facilitate online business operations bypassing the traditional model while offering distinct competitive advantage to the organizations in context (Chui & Fleming 2011).

Organizations demonstrating high agility adapt to rapidly changing business environment and excel by harnessing the opportunities for innovation. Such organizations also demonstrate credible capabilities in accessing new markets, launching new products & services and forging strategic alliances (Brown, S.L., and Eisenhardt, K.M., 1997).

DIFFERENTIATION AND INFORMATION TECHNOLOGY

Organizations can develop several IT capabilities such as use of online chat and access to social networks to understand and serve the customers better. They can also reap huge rewards through IT value added services in engaging and retaining customers while generating business for the organizations (Booth, Roberts, and Sikes 2011).

The initial claim that IT doesn't matter lies consistent with treating IT as a magnifying glass used to increase the impact of already existing resources rather than creating new strategic advantages (Carr 2003, 2004). This makes the scenario even more attractive for organizations to utilize IT with already existing resources and multiply resources, enhance existing capabilities and create new capabilities. These capabilities form the rationale behind use of IT in creating competitive differentiation for the organizations and impact on their performances (Carr 2004).

IT helps an organization in differentiating through price, product innovation, reduced time to market and enhanced customer service (Bloch et al., 1996). Organizations can benefit from customized products & services and enhanced customer interactivity through Internet offering sustained competitive differentiation. Also the organizations can benefit from invaluable intelligence generated through rigorous customer interaction and its utilization in customizing products in differentiated manner (Fruhling & Digman, 2000).

IT can provide opportunities for establishing brand image of organizations through differentiation it offers. Organizations use multiple media (online) to reinforce brand identities and generate loyalty by demonstrating higher differentiation and ultimately increasing the market share (Smith, 2000).

OBJECTIVES AND HYPOTHESES

Based on the review of literature in competitive advantage through Information Technology, the research was undertaken to assess the impact of Information Technology on Innovation and Differentiation in organizations.

More specifically, the present research aims to achieve the following objectives:

1. To assess the impact of Information Technology on Innovation in organizations.
2. To assess the impact of Information Technology on Differentiation in organizations.

The following hypothesis was framed in the light of the above mentioned objective:

H1: Information Technology significantly influences Innovation in organizations.

H2: Information Technology significantly influences Differentiation in organizations.

RESEARCH METHODOLOGY

The research uses a structured questionnaire to assess the impact of Information Technology on Innovation and Differentiation in organizations. The respondents were first explained the concept of competitive advantage through a small introductory note and were then asked to rate the impact of Information Technology on Innovation and Differentiation in their respective organizations. The respondents were also requested to not to answer the survey, if they didn't use Information Technology for the above objectives.

Mainly, small and medium organizations of National Capital Region (NCR) of India were targeted for data collection purposes.

Primary data was collected through purposive sampling method as only the organizations, which were using Information Technology for Innovation and Differentiation, were asked to give responses.

Out of 212 questionnaires issued, 117 filled in responses were received. Out of 117 responses received, 103 responses were found to be duly filled in and were included in data analysis.

However, 08 responses were collected through eSurv.org, out of which 06 responses were again from NCR and remaining 02 responses were from rest of India.

In totality, 111 responses were analyzed through Reliability Test, Chi Square Test and Regression Analysis.

Structured questionnaire used five-point Likert scale ranging from Very High (5) to Very Low (1) to obtain the responses from respondents.

Reliability of the data was checked through Cronbach Alpha Score and Spearman-Brown Prophecy Score. After testing the reliability, significance of data was checked through Chi Square Test and finally Regression Analysis was performed to check the dependence of differentiation on innovation.

ANALYSIS

Suitable variation is indicated in the demographic profile of 111 respondents, with most of the organizations having turnovers less Rs 200 crores (78.2%). While on the other side, only 14.1% organizations were having turnovers between Rs 200 crores and Rs 500 crores. Also, around 7.7% organizations declined to share this information during survey.

Both items were rated on five point Likert scale (1-5) with responses ranging from "Very High" to "Very Low" by the respondents. Demographic question (fixed alternative) pertaining to the respondent's organization, designation, turnover etc were asked in the first section. Besides the demographic questions, 2 items (impact factors) were asked in the second section.

Reliability of these factors and consistency of the scale was tested through reliability tools Cronbach's Alpha and Spearman-Brown Prophecy. High values (>0.5) for all measures indicate good reliability.

Table 1: Reliability Test

Cronbach's Alpha Score	Spearman-Brown Prophecy Score
0.953066543	0.953077103

Table 2(a): Innovation

Responses	Observed N	Expected N	Residual
Very High	26	22.2	3.8
High	31	22.2	8.8
Moderate	20	22.2	-2.2
Low	25	22.2	2.8
Very Low	09	22.2	-13.2
Total	111		

Table 2(b): Differentiation

Responses	Observed N	Expected N	Residual
Very High	25	22.2	2.8
High	30	22.2	7.8
Moderate	21	22.2	-1.2
Low	25	22.2	2.8
Very Low	10	22.2	-12.2
Total	111		

Table 2(c): Chi Square Test Result

	Innovation	Differentiation
Chi-Square	12.56	10.22
df	4	4
Asymp. Sig.	0.0136	0.0369

The value of $\chi 2$ test for innovation is 12.56 at four degrees of freedom. Since, the value of p is less than .05 i.e. (0.0136), we can infer that information technology significantly impacts innovation in an organization.

The value of $\chi 2$ test for differentiation is 10.22 at four degrees of freedom. Since, the value of p is less than .05 i.e. (0.0369), we can infer that information technology significantly impacts differentiation in an organization.

The researcher has defined innovation as an independent variable (henceforth known as X) and differentiation as a dependent variable (henceforth known as Y).

The researcher has tried to ascertain whether differentiation is dependent on innovation through regression analysis. The researcher has obtained regression coefficient as .997, which is quite satisfactory and therefore it can be safely concluded that differentiation is dependent on innovation.

Regression equation thus obtained is:

Y=2.230 + 0.900X

Table 3(a): Regression Analysis				
Measure	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
Innovation	.997a	.995	.993	.62927

a. Predictors: (Constant), Innovation

Table 3(b): Interactive Effect of Innovation on Differentiation					
Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	2.230	.883		2.526	.086
Innovation	.900	.038	.997	23.869	.000

Dependent Variable: Differentiation

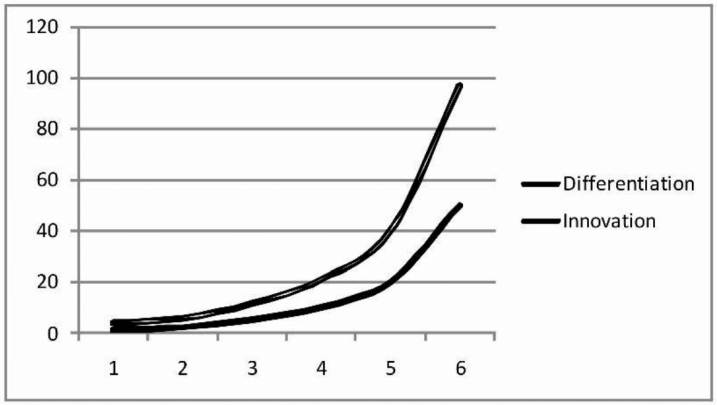

Figure 1: Regression Equation Chart

Graph of the equation (Y=2.230 + 0.900X) plotted also indicates that differentiation is dependent on innovation.

CONCLUSION

This research has established that information technology significantly impacts innovation in organizations enabling them to differentiate themselves from their competitors. As information technology offers numerous benefits to adopting organizations, this opportunity offers tremendous potential to organizations to focus more on innovation and differentiation.

With small and skewed nature of sample of the organizations using information technology, the results of the present work can motivate organizations to put systems in place to carefully embrace information technology and bring more innovation related activities under its ambit to finally succeed in achieve differentiation.

LIMITATIONS

This research had limitations such as small sample size, localization (NCR), and bias. Therefore, generalizing the results for a larger domain remains questionable for the time being. Futures researches with larger and diverse samples may certainly help in deriving concrete conclusions. Also, the contribution of innovation in achievement of differentiation needs to be ascertained with more comprehensive research that can act as motivation for organizations to put systems in place to harness true potential of information technology for innovation and differentiation.

Finally, the findings of present research work need to benchmark against any future framework pertaining to information technology and its contribution in innovation and differentiation.

RECOMMENDATIONS

The researcher after the data analysis in this research paper can safely conclude that information technology significantly impacts innovation in organizations and enables them to differentiate themselves from their competitors. Furthermore, that differentiation was found to be dependent on innovation. The researcher therefore recommends that organizations should use information technology to carefully embrace more innovation related activities under its ambit and achieve differentiation.

FUTURE RESEARCH WORK

The researcher is willing to do additional research and explore this area further in order to identify other influencing factors leading to comprehensive innovation and differentiation. The researcher intends to do further research for comparing impacts of information technology in supporting innovation for achieving differentiation among Indian and Multi National Corporate (MNC) organizations. The researcher also intends to conduct bigger research study for assessing the impacts of information technology on innovation as well as differentiation and to develop a performance metric for information technology in order to enable organizations worldwide to utilize resources judiciously.

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Tarun Kumar Singhal, PhD, is Professor in IT Management Area at INMANTEC Business School, Ghaziabad, India. He has done Ph.D. on "Assessment of Efficiency of Organizational Processes through Software Systems" from Dr BR Ambedkar University (Formerly Agra University), Agra, India. He did MS (Software Systems) from BITS Pilani, Pilani, India and MSc (Mathematics) from CCS University, Meerut, India. He also holds international certifications from Microsoft, Cisco and Brainbench. He has about one and a half years of corporate experience and more than twenty years of teaching experience. His research papers have been published in reputed journals.

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