Spring 3-23-2010

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Abstract

In this paper we present results of an empirical study based on the opinions of 220 senior IT managers in the USA on critical success factors in the strategic use of IT. Our results show that competitive business strategies together with the competence of senior IT executives play the most important role in creating the strategic value of IT in organizations. The other critical factors were human IT assets, innovativeness and knowledge management, IT-business partnerships, IT-business alignment and IT support for business. These factors contribute to the strategic value of IT and hence to the sustained competitive advantage. In the midst of the heated discussion on the strategic value of IT, our study show that IT can contribute to the competitive advantage of an organization, if a comprehensive approach to using IT is adopted.

Keywords: Critical success factors, information technology, competitive advantage, strategic value, IT resource, IT capability, Resource based view, VRIO framework.

1.0   Introduction

Assessing value of IT and using IT for strategic and competitive advantage has been an area of concern to academicians and practitioners for the past two decades. This has been further fueled after an article in HBR and a book by Carr (2003) who claimed that IT has become a commodity similar to having services such as telephone or electricity, and has lost its strategic value. Academicians and practitioners have debated in favor of and against Carr's proposition. Due to dot com bubble, Carr's proposition, continuous influx new information technologies, the recent recession, and a very competitive IT business environment, a number of IT and business leaders are in a state of confusion: what to do? This situation has already caused serious implications (e.g. reluctance in new IT investment, reduction in IT budget, fewer jobs and less pay) and may have more adverse effects on the future of the IT industry. In this paper we re-examine the argument whether IT still plays an important role in creating strategic advantage to organizations or not. If so, what are the elements that contribute to the strategic value of IT.

Carr (2003) has suggested that IT is ubiquitously available and has lost its importance. Some IT leaders support Carr's argument (Lewis 2003, Hittleman 2003; Skaistis 2003). While critics of Carr's assertion argue that the reasons behind the views that IT might be losing its importance could be due to the reason that applying just the technology itself is not enough to guarantee strategic competitive advantage! (Brown and Hagel 2003; Broadbent et al., 2003). Bannister and Remenyi, (2005) argued "Carr's paper seems to have had a material impact on stakeholders' behavior, despite the fact that the empirical evidence supporting his assertions is open to challenge at several levels."

In consideration of the discussion raised by Carr, we have attempted to extract the factors found in literature that contribute to the strategic value, IT can add to an organization. Also, we have attempted to empirically test how senior IT executives and managers currently perceive the strategic value of IT in the USA. In this research we have investigated the impact of management and organizational factors in addition to the IT technologies themselves. This paper builds on the previous research on the strategic value of IT and empirically tests important findings of the previous research works together with new factors in a comprehensive way. Furthermore it has been suggested in the literature that we have reviewed, that senior executives and managers are the most informed about the state of affairs in an organization, therefore, in this paper we have solicited views of senior IT managers on the strategic value of IT. We believe that by soliciting the views of senior IT managers on this matter will help us have a better understanding of the current state of affair of the strategic value of IT, and will aid us in finding better solutions and decisions. This study also fills the gaps between the theoretical developments on the business value of IT and the need of empirical studies to support those developments.

In the next section we review literature on competitive advantage due to IT with the purpose of identifying key factors that contribute to the strategic advantage of IT. Based on the literature review and the author's own experience of the IT industry, a Framework of Critical Success Factors (CSFs) is developed. Later, we present results of the opinions of senior IT managers if the identified IT CSFs Framework is relevant today, if so, how

important it is in current economic situation, followed by conclusions and limitation of the study and suggestions for future research.

2.0 Literature Review

2.1 IT and Competitive Advantage

There has been considerable research on various aspects of the business value and strategic value of IT during the past few years. However, most of these studies focused on a particular aspect of strategic value of IT at an organizational level (e.g. Byrd (2004) , who focused on the impact of IT personnel skills on IS Infrastructure and Competitive IS) whereas some have focused on an industry sector (e.g. Neirotti and Paolucci (2007) on Insurance sector). Indeed those aspects contribute to the strategic value of IT, however, strategic value of IT is not limited to a few factors in isolation but rather a combination of a number of important factors integrated in an effective way. There is need to take a comprehensive approach in determining the factors that contribute to the strategic value of IT. This paper fulfills that need by taking a holistic approach that considers technological, management and organizational factors that contribute to the strategic value of IT.

Assessing the strategic value of IT has always been a challenge for organizations for various reasons mentioned in the literature. Ross et al (1996) summarized that "assessing the value of IT has never been easy: delayed benefits, unintended uses, business changes and hidden costs inhibit meaningful evaluations of individual IT investments." Despite the difficulties in assessing value of IT, productivity paradox has been refuted at the firm and country levels (Dedrick et al., 2003). Dewan and Kraemer (2000), Kraemer and Dedrick (2001), and Krishna and Walsham (2005) have found that IT is used in improving operational performance and productivity .

Recent researchers have found that managing IT capabilities can create unique opportunities and provide organizations a competitive advantage (Armstrong and Sambamurthy, 1999; Bharadwaj, 2000; Tallon et al., 2000; Byrd et al., 2001; Ravichandran and Lertwongsatien, 2005; Dehning and Stratopoulos, 2003; Kearns and

Lederer, 2004; Sambamurthy et al., 2003; Wade and Hulland, 2004; Melville et al., 2004; Byrd et al., 2004; Bhatt and Grover, 2005; Rivard et al., 2006; Huang, et al., 2006; Gregor, et al., 2006; Neirotti and Paolucci, 2007) . Bhatt and Grover (2005) have compared four perspectives on IT and competitive advantage, and concluded that "by identifying specific IT-Based resources and their implications for competitive advantage in contemporary environments, we can guide managerial decision making". Bhatt and Grover (2005) have further suggested that the resource-based view (RBV) provides a better approach for evaluating the strategic value of IT to organizations. We have adopted the RBV approach to find out which assets, and in what ways those assets contribute to the strategic value of IT to organizations.

2.2 Resource based Approach:

The resource based view of a firm argues that firms compete on the basis of their unique resources. A resource becomes a source of competitive advantage when it is both strategically valuable and difficult for competitors to imitate (Ross et al, 1996). The RBV of the firm is based on two assumptions of resource heterogeneity and resource immobility. The resource heterogeneity assumes that firms can be thought of as bundles of productive resources and that different firms possess different bundles of these resources. The resource immobility assumes that some of these resources are either very costly to copy or inelastic in supply. Heterogeneity and immobility of resources make the strength of the firm and thus are a potential source of competitive advantage for the organization.

In the context of resource based view of the firm, resources are all assets, capabilities, competencies, organizational processes, firm attributes, information, knowledge and so forth, that are controlled by a firm and that enable the firm to conceive of and implement strategies designed to improve its efficiency and effectiveness (Barney, 2007). We have adopted Barney's (2007) definition of asset.

Based on the definition of resources and the two assumptions of resource heterogeneity and immobility, Barney (2007) has developed a framework known as VRIO framework

(Value, Rarity, Imitability and Organization). This framework is based a series of four questions to be asked about the business activities in which a firm engages:

Value: Do a firm's resources and capabilities enable the firm to respond to environmental threats or opportunities?

Rarity: Is a resource currently controlled by only a small number of competing firms?

Imitability: Do firms without the resource face a cost disadvantage in obtaining or developing it?

Organization: Are a firm's other policies and procedures organized to support the exploitation of its valuable, rare and costly-to-imitate resources?

Resource based framework suggests that an organization's structure, control systems, and compensation policies should support and enable a firm's efforts to exploit fully the valuable, rare, and costly-to-imitate resources and capabilities it controls. Santhanam and Hartono's (2003) study showed that firms with superior IT capability exhibit superior current and sustained firm performance compared to average industry performance. They suggested developing theoretically derived multi-dimensional measures of IT capability in order to continue to apply the RBV approach to assess the impact of IT investment on firm performance.

Thus this paper takes a multi-dimensional comprehensive approach in identifying IT capabilities that contribute to strategic value of IT. Based on an extensive literature review on strategic value of IT, we identified the following IT organizational assets and core competencies that contribute to the competitive advantage of an organization:

Organizational Asset: Ross et al. (1996) have identified that Human Assets and Technical assets contribute to the strategic value of IT. Bhatt and Grover (2005) found that while the quality of the IT infrastructure adds value to the organization, it did not have a direct effect on competitive advantage. Bhatt and Grover (2005) also found that however, the quality of IT business expertise (IT groups understanding about the business) and the relationship infrastructure (relationships between IT and business managers) did have a significant effect on competitive advantage. Huang et al. (2006)

showed that organizations with high human-IT resources and IT infrastructure tend to have high IT-enabled intangible assets, and found that IT-enabled intangibles have a strong positive correlation with firm performance. Also, Bhatt and Grover (2005) found that IT infrastructure and Information Assets are valuable organizational assets. In Organizational Assets category, we have included IT infrastructure, Human IT Assets and Information Assets and have derived measurement scale for these elements from the above mentioned studies.

IT relationships: A number of studies have identified the importance of IT and business relationship as one of the major contributor to the strategic use of IT. Neirotti and Paolucci (2007) reported that some companies did not succeed in attaining a strategic advantage through IT projects because of the weak relationship between the business and IT planning processes. Also, Ross et al. (1996) identified that relationship assets strongly influence the ability of an organization to use IT for strategic objectives, suggesting that the relationships between IT and businesses are crucial for the effective use of IT.

Knowledge Management: We are living in the information age and knowledge is one of the most important assets of modern organizations. Organizations that manage and use knowledge in an intelligent way have a competitive advantage over their competitors. Armstrong and Sambamurthy (1999) reported that Chief Information Officers (CIOs) who possess high strategic IT knowledge can direct their teams better about IT related issues. Keen (1991) found that IS departments could be affected when top management do not have high strategic IT knowledge, consequently, this situation can jeopardize the organization's effectiveness in using IT. Zmud (1984) reported that when CIOs have greater knowledge in business and IT they assist the "push-pull" dynamics of IT innovation and in merging technology capabilities with business necessities. Jarvenpaa and Ives (1991) added that CIOs with superior strategic knowledge in business and IT are treated as valuable participants and therefore maintain better relationships with top management. Dehning and Stratopoulos's (2003) study found that managerial IT skills are positively correlated to sustainable competitive advantage. Armstrong and Sambamurthy (1999), and Bhatt and Grover (2005) found that knowledge of IT staff and management of organizational knowledge contribute significantly to the strategic use of

IT in an organization. In the Knowledge Management category, we have included knowledge of IT staff and management of organizational knowledge.

Innovativeness and IT Investment: Investment in IT acts as a "facilitator" that allows other innovations to take place (Brynjolfsson and Hitt 2000; Edwards, 2002). Therefore, investments in IT do not have a large direct impact on productivity as their effect is indirect and related to changes in other aspects, such as the process of productivity. The main driver to strategic advantage is the use of IT to support creativity and innovation in processes, procedures, and practices of organizations (Bannister and Remenyi, 2005). Bannsietre and Remenyi (2005) concluded that "Today it is realized that the primary driver of strategic value and thus strategic advantage is the application of innovative, creative and imaginative procedures, processes, and practices that differentiate an organization from its competitors. IT can play an important role in this but only in as far as it supports organization's innovation, creativity and imagination". Brown and Hagel (2003) asserted that extracting value from IT requires innovation in practice, the economic impact of IT is incremental, not like that of a big bang, and that consequently, the strategic effect of IT investment is cumulative. Kumar (2005) ascertained that IT facilitates strategic advantage by providing solutions to investments and competition, while also being able to help a company reengineer and radically reinvent itself for success. Tallon et al. (2000) found that when organizations have clear goals for investment in IT, it can positively impact a firm's performance at multiple points along the value chain. Huang et al. (2006) showed that IT investments provide a positive contribution to organizational IT infrastructure. Byrd et al. (2004), Bhatt and Grover (2005), Neirotti and Paolucci (2007), all reported that innovativeness and IT investment play an important role in the strategic use of IT.

IT Strategic Planning: Neirotti and Paolucci (2007) found that if business goals are not aligned with the goals IT projects are trying to accomplish, IT will not work to facilitate the success of the businesses endeavors. Kearns and Lederer (2004) identified that participation and alignment of IT in business planning, and vice versa the alignment between the business and the IT plans have a positive impact on the use of IT for

competitive advantage. Armstrong and Sambamurthy (1999) found that alignment of IT and business strategy, and predominating strategies are main contributors to the strategic value of IT.

IT support for Business: Kearns and Lederer (2004) identified IT support for business as a critical element that lead to competitive advantage. Also, Kearns and Lederer (2004) and Feeny and Willcocks (1998) have found that informed buying of IT services, contract facilitation and management contribute to effective use of IT, and hence to strategic advantage.

Tactical deployment of IT projects: Whilst considering the low success rate of IT projects (CHAOS Standish report, 2007), we believe that the tactical deployment of IT projects could contribute to the success and performance of an organization.

Competitive advantage strategies: Mata et al. (1995) emphasized the value of managerial and technical IT skills in sustaining a competitive advantage from IT. Byrd et al. (2004) found that the skills and knowledge of IT staff has become significantly important, as the strategic value of IT is becoming vital in modern organizations. In their study, a significant and positive relationship was found between the skills and knowledge of IT staff personnel and IT's contribution to competitive advantage. Armstrong and Sambamurthy (1999) and Kearns and Lederer (2004) found that IT support to achieve various business strategies and knowledge of senior IT executives contribute to sustained competitive advantage.

Bharadwaj (2000) reported that by using profit and cost-based performance measures, organizations with high IT capability tend to do better than organizations without. They suggest that a positive and significant relationship exists between IT capability and superior firm performance. Bhatt and Grover (2005) reported that performance of the organizations by implementation of strategies supported by IT in relation to their competitors indicates the benefits reaped by best IT practices.

Based on the above literature review on strategic value of IT, we developed a framework of IT Critical Success Factors (CSFs) that can contribute to the competitive advantage of an organization.

2.3   IT Critical Success Factors Framework:

Critical Success Factors (CSFs) are the important factors or activities that organizations should focus their efforts in building those capabilities in order to be successful in their business.

Table 1 briefly describe the factors and the sources of the elements that were used in the survey questionnaire.

Factors	*Source*
Organizational Assets	*IT human resource assets:* Ross et al. (1996), Fenny and Wilcocks (1998), Mata et al. (1995), Bhat and Grover (2005)
	IT infrastructure: Fenny and Wilcocks (1998), Bhatt and Grover (2005), Huang et al. (2006)
	Information assets: Kearns and Lederer (2003), Huang et al. (2006)
IT Relationships	*Business-IT relationships:* Ross et al. (1996), Fenny and Wilcocks (1998), Bhat and Grover (2005)
Knowledge Management	*Knowledge Management:* Kearns and Lederer (2003), Huang et al. (2006)
	IT staff knowledge: Mata et al. (1995), Ross et al. (1996), Armstrong and Sambamurthy (1999), Bhatt and Grover (2005), Keen (1991), Zmud (1989), Jarvonpaa and Ives (1991), Dehning and Stratopoulos (2003)
Innovativeness and IT investment	*Innovativeness:* Byrd et al. (2004) , Bhatt and Grover (2005), Bannister and Remenyi (2005)
	IT investment : Tallon et al. (2000), Boynjolfsson and Hitt (2000), Edwards (2000), Huang et al. (2006), Neirotti and Paolucci (2007)
IT Strategic Planning	*IT participation in business planning:* Kearns and Lederer (2004), Neirotti and Paolucci (2007)
	IT-Business strategy alignment: Kearns and Lederer (2000)

	Predominant position strategies: Armstrong and Sambamurthy (1999), Kumar (2005)
IT Support for Business	*Business dependence on IT :* Kearns and Lederer (2004)
	*Informed buying of IT servic***e:** Fenny and Willcocks (1998)
	Contract monitoring: Fenny and Wilcocks (1998)
	*Contract facilitation***:** Fenny and Wilcocks (1998)
Tactical Deployment of IT Projects	*Tactical Deployment:* CHAOS Standish Report (2009)
Competitive Advantage Strategies	*Competitive advantage due to IT:* Kearns and Lederer (2004), Kumar (2005), Armstrong and Sambamurthy (1999)
	Firm's performance in comparison to their competitors: Armstrong and Sambamurthy (1999)
	Knowledge of senior IT executives: Armstrong and Sambamurthy (1999), Fenny and Willcocks (1998), Dehning and Stratopoulos (2003)
	Firm's performance during the past three years: Bhatt and Grover (2005), Bharadwaj (2000)

Table 1. IT Critical Success Factors Framework

We used these factors in our survey of senior IT managers of organizations in USA. This survey was conducted to gain an understanding of their relevance in current economic environment. In the next section we discuss research design, followed by discussions of results, conclusions, limitations of our research and suggestions for further research.

3.0 **Research design**

Realizing the importance of strategic value of IT in organizations, we collected data on various aspects of IT practices, usage, and utilization of IT as a strategic asset in organizations in USA.

First, a literature review was conducted to learn about the factors that contribute to the strategic value of IT in organizations. Based on the literature review and the author's own experience of working in the IT industry, a questionnaire was designed to investigate the most important and relevant practices that contribute to the strategic use of IT and ultimately sustained business performance of organizations. The questionnaire was sent to a selected IT professionals and academicians for their review and comments. The questionnaire was refined based on their feedback.

The questionnaire was divided into nine sections (mentioned in the objectives of the study) with twenty subsections comprising of 100 opinion based questions and six questions related to personal and organizational data. Respondents were asked to solicit their opinion about the statements on a Likert Scale of 1 to 7, choosing 1 for 'strongly disagree' to 7 for 'strongly agree'. Recent research (Dawes, 2008) have found that a 5 or 7 point scale may produce higher mean scores. Therefore we selected a 7 point scale. Questions asked in each section are included in the graphs in the next section. A copy of the questionnaire is also available on request.

Byrd and Turner (2001) have mentioned that past studies have shown that the senior IT executives (CIO, Vice President of IT, Director of IT) represent the most accurate source of organizational information regarding IT in an organization. We utilized Zoomerang's TrueSample™ and ZoomPanel™ to get response of senior IT managers. Our sample consist of senior IT managers from all industry sectors across USA. Zoomerang Sample™ validates all survey-takers to ensure that they are who they say they are. Zoomerang™ verify respondent information with a process that utilizes the same automatic real-time validation technologies that help prevent credit card fraud and identity theft. Zoomerang™ use digital fingerprinting to ensure that no respondent can enter a survey twice.

The questionnaire was posted on Zoomerang™ (a survey organizing organization) online survey system. Zoomerang™ contacted the panel participants based on our profile of senior IT managers. Participants were provided with instructions and a link to access and complete the survey. About 220 senior IT managers completed the survey. A summary of the results was sent to the participants. The results of the survey are presented in the next section.

4.0 **Results:**

4.1 Personnel and Organizational Information: Profile of Respondents

Gender: 60% of respondents were male and 32% were female, 8% did not mention the gender.

Age group: The results show that 38% respondents were in the age group of 46-55 years of age, 29% in the age group of 35-45 years, 19% among 26-35 years, and 14% over 56 years of age. It shows that 67% of respondents were between the age of 35-55 years.

Years of experience: Approximately 35% of the respondents have between 11-22 years of experience, 26% have over 22 years of experience and 25% have less than 10 years of experience. This shows that about 75% of the respondents have over 10 years of experience.

Organization Type: Private organizations play an important role in the development of a country. This research paid extra attention in obtaining more data from private organizations. This is because the private sector is generally considered to be more aggressive in adopting strategies and new technologies to gain competitive advantage compared to government and non-profit organizations. Almost 52% of the organizations surveyed were in the private sector, 30% were publicly traded,10% government organizations and 7% non-profit organizations.

Industry sectors: In our survey, Services industry sector represented the highest respondents (16%), followed by Financial sector (14%), Education (12%), Health Care (11%) and Education (9%) and 38% from other industries.

Reporting Authority: In our survey about 32% of the respondents report to CIO, 19% to CEO, CFO and COO, whereas 47% report to other senior management.

4.2 Organizational Assets:

Organizational IT assets that contribute to the strategic value of IT includes IT Human resource capability, IT infrastructure and Information assets.

IT human resource assets:

Adequately trained IT staff can help solve business problems. To test that argument, respondents were asked to evaluate the capabilities of their IT staff. Figure 1 illustrates that a vast majority of IT staff have technical capabilities that match with the IT plan (76%), IT staff is expected to solve business problems (75%), and IT Staff continuously acquire new knowledge (72%). IT staff is close to the business, and IT Staff regularly invest in training in technical, business and interpersonal skills (57%). Also, 62% of organizations felt that their retention of IT staff was higher than the industry average.
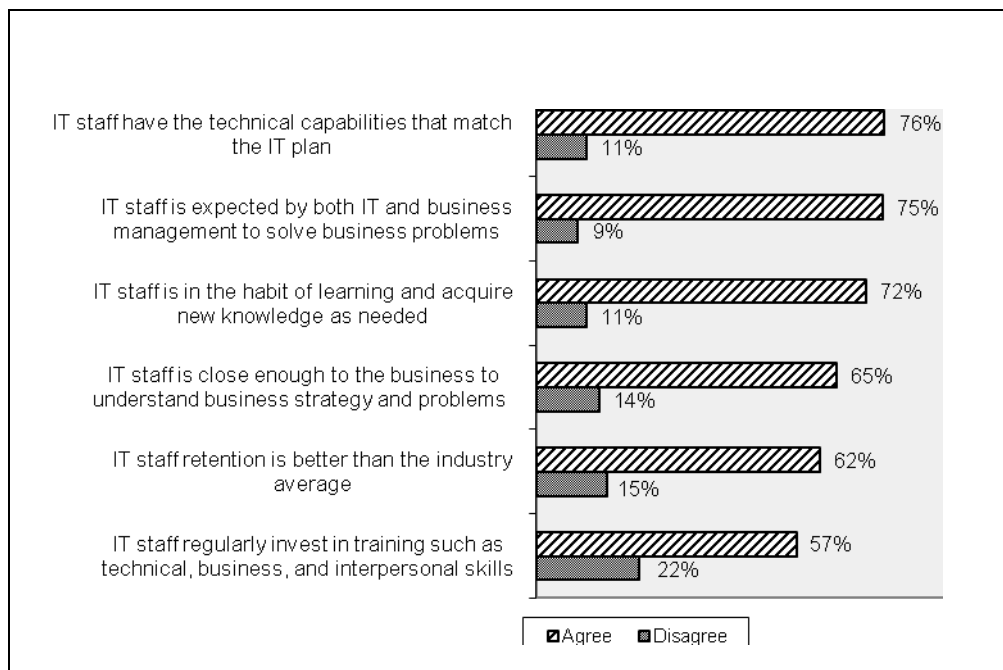
Figure 1. IT Human resource asset

IT infrastructure:

According to Bhatt and Grover (2005), a quality IT infrastructure provides an organization the ability to share information across different functions, innovate, exploit business opportunities, and respond easily to changes in business strategies. A quality IT infrastructure plays an important role in utilizing IT technology resources efficiently and effectively. Armstrong and Sambamurthy (1999) found that the sophistication of IT infrastructure has a significant impact on IT assimilation. A modular, scalable and

transparent IT infrastructure that is based on commonly agreed standards is regarded as a quality IT infrastructure (Bhatt and Grover, 2005). Figure 2 illustrates that the IT infrastructure in 78% of the organizations we sampled can handle multiple applications, use commonly agreed standards (72%), based on corporate Enterprise Architecture (61%) and is modular, scalable and transparent(53%). We see that most of the organizations have a reasonably well IT infrastructure built on best IT architecture practices.
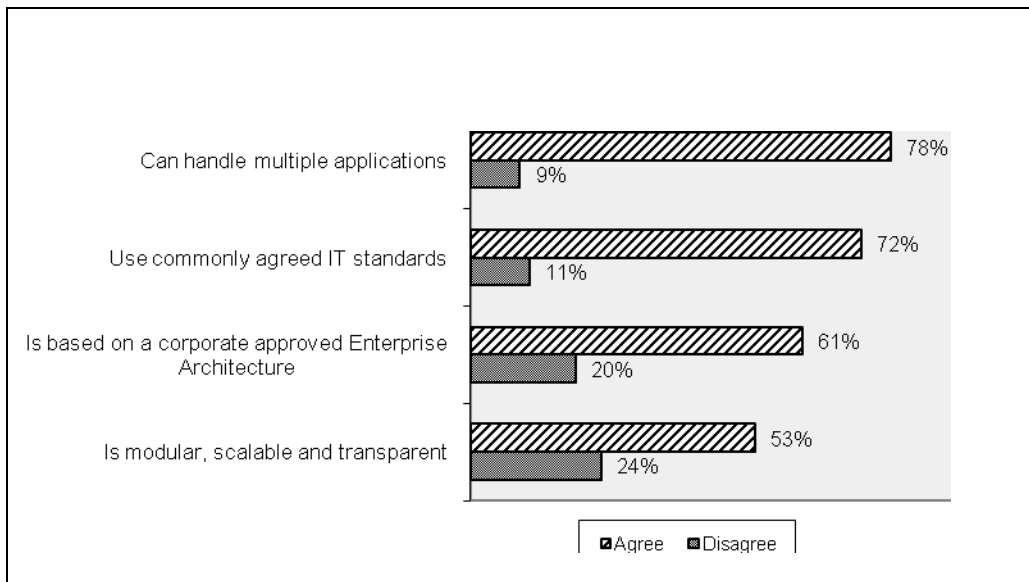
Figure 2. IT Infrastructure

Information assets:

Due to the shift to knowledge based societies, information and knowledge are considered to be the key assets in an organization. Figure 3 shows that 71% of organizations have the right information to run the business; 70% use information to identify and improve current operations, products and services, 67% use information to make fact based management decisions, 66% use information to allocate resources and make investment for achieving organizational strategy and goals. Around 64% of organizations use information to measure business impact, results and benefits. We can conclude from these findings that organizations are making best use of their information assets in improving business performance and gaining competitive advantage.
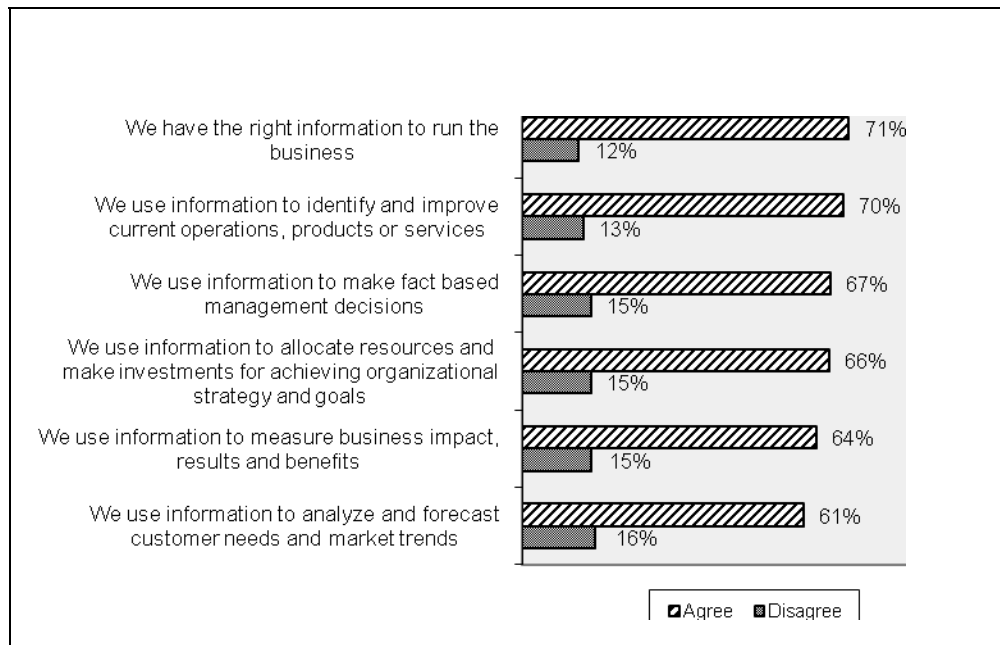
Figure 3. Information Asset

4.3   IT Relationships

A strong IT-business relationship is characterized by significant mutual knowledge about the needs of the businesses and the capabilities of information technology. It is also desirable as the levels of respect between IT and client's quality in communication, negotiation and coordination from both sides (Ross et al., 1996). Figure 4 demonstrates that in the vast majority of organizations, It and business managers use formal and informal communication channels (70%), large projects have senior management sponsorship and leadership (67%), IT and business managers consult each other on business and technical matters (62%), IT and business executives share a vision of how IT will support the business (61% and IT and business managers are satisfied with their ability to communicate and negotiate with each other (61%).
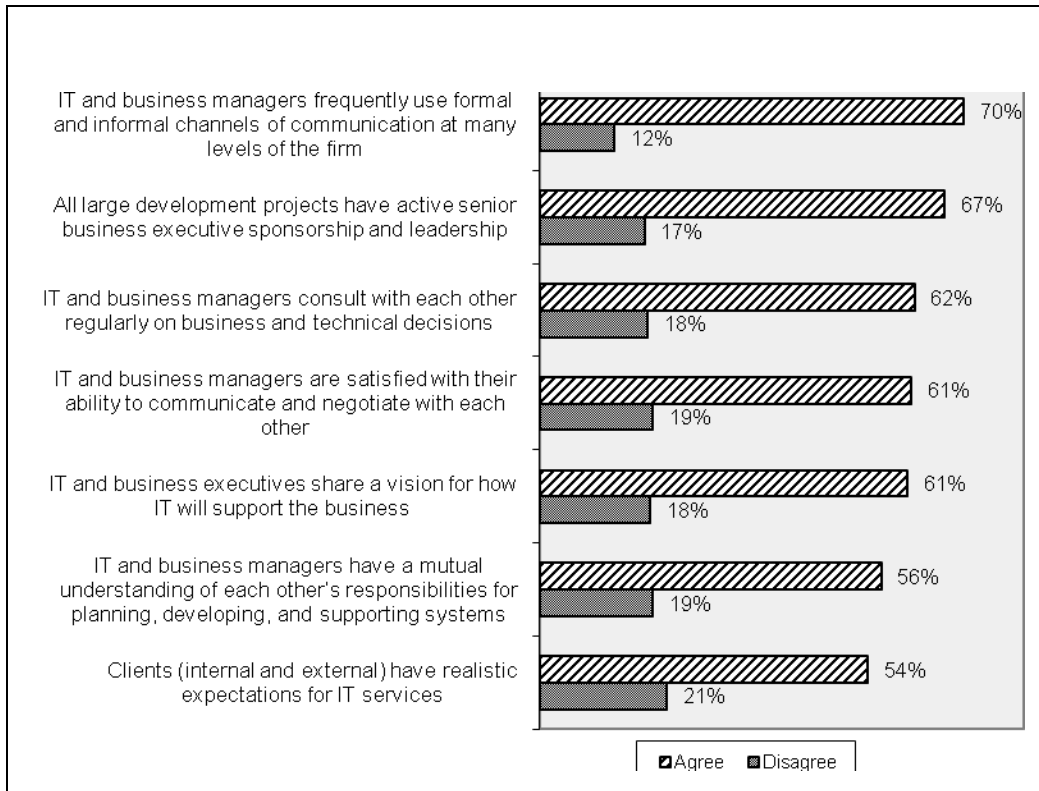
Figure 4. Relationships between IT and Business

4.4 Knowledge Management

Knowledge management and knowledge of IT Staff are key factors that contribute to the strategic use of IT.

Knowledge management

Knowledge management consists of collecting, organizing, sharing, and analyzing the knowledge based on people, skills, resources, strategies and practices. Advances in technology have changed the way in which information is accessed and shared. Knowledge is regarded as a strategic advantage in today's competitive business environment if well managed. The survey results in Figure 5 demonstrate that the majority of organizations are known for their excellent technological expertise and knowledge (71%) and their products and services have a strong knowledge component (69%) and knowledge management is a characteristic of their organization (65%).
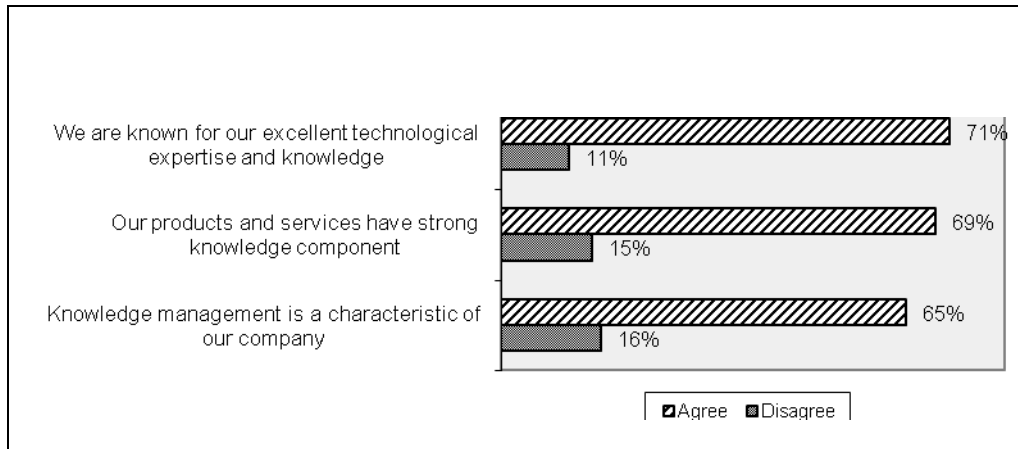
Figure 5. Knowledge management

IT staff knowledge:

Ross et al. (1996) highlighted the importance of IT staff that acquire both business and technical skills. Clark et al. (1997) found that the skills of IT staff directly affect the organization's ability to rapidly deploy and develop important systems for the long term competitive advantage. Figure 6 shows various aspects of the knowledge of IT Staff. IT groups are knowledgeable about business policies(65%), business strategy (63%) and competitive priorities (61%). IT groups are able to initiate change in the organization (58%), executives and managers provide clear and effective leadership to IT (57%), IT groups are knowledgeable about business opportunities (56%), and top management is knowledgeable about how their competitors are using and applying IT for competitive advantage (56%).
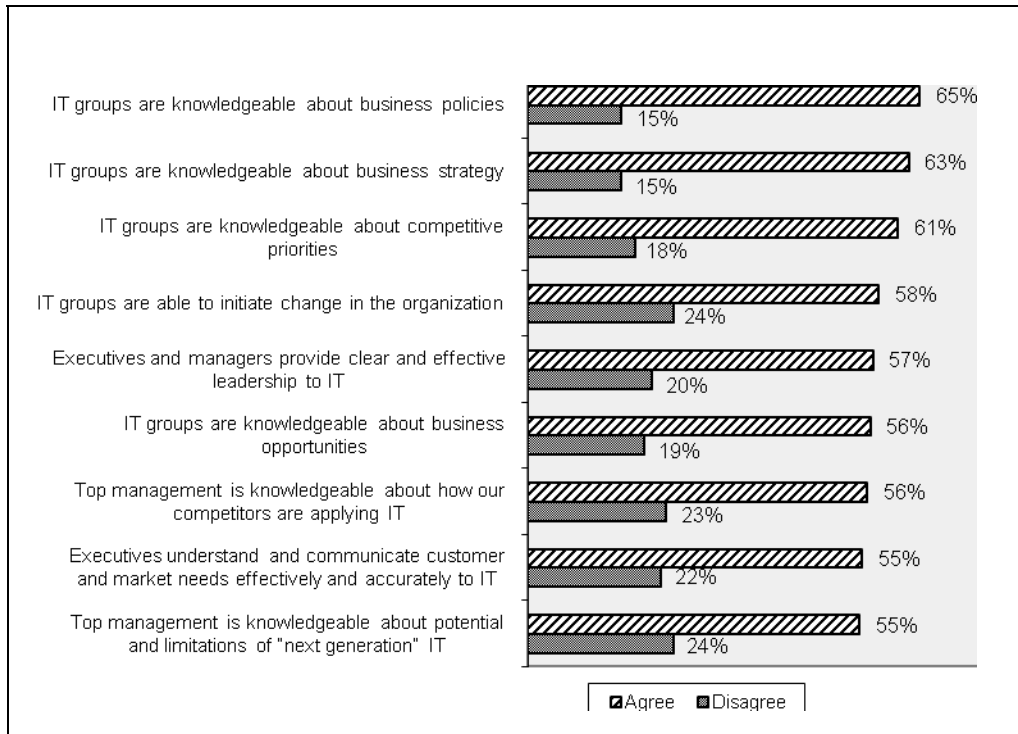
Figure 6. Knowledge of IT staff

4.5 IT Investment and Innovativeness

IT Investment and innovativeness of an organization has been identified as important factors that contribute to the strategic value of an organization. IT is viewed as a primary source of business innovation. Organizations constantly search and acquire new and relevant knowledge, and assimilate and apply that new knowledge. It has been suggested that IT innovativeness contributes to the strategic value of an organization. The effect of IT investment on the productivity of organizations has been studied in IT paradox studies. There were mixed results about IT investment and its contribution to the productivity of the organizations (Silvius, 2006). In our survey we investigated the effectiveness of IT investments and IT innovativeness.

IT innovativeness:

Results of our survey displayed in Figure 7 illustrate that IT is used as a component for information based innovation (68%), and that IT is utilized to widen the array of products and/or services (66%). It seems that organizations make concerted efforts for the exploitation of existing competencies and the exploration of new knowledge (65%),

organization assimilates and applies relevant new knowledge and consistently search and acquire it(61%). Also, IT is used as a primary source of business innovation (60%).
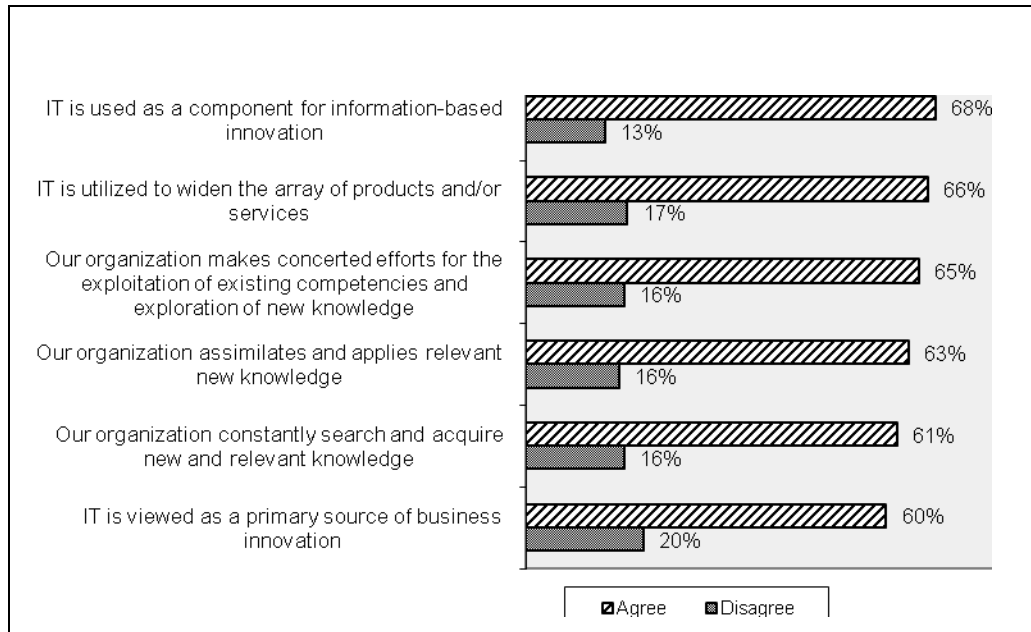
Figure 7. Innovativeness

IT Investment:

Neirotti and Paolucci (2007) found that governance systems for IT investment created key differences between organizations in their use of IT for building innovative business capabilities. In our survey about 63% respondents reported that top management is committed to IT investment. However, only 57% have formal appraisal methods as shown in Figure 8.
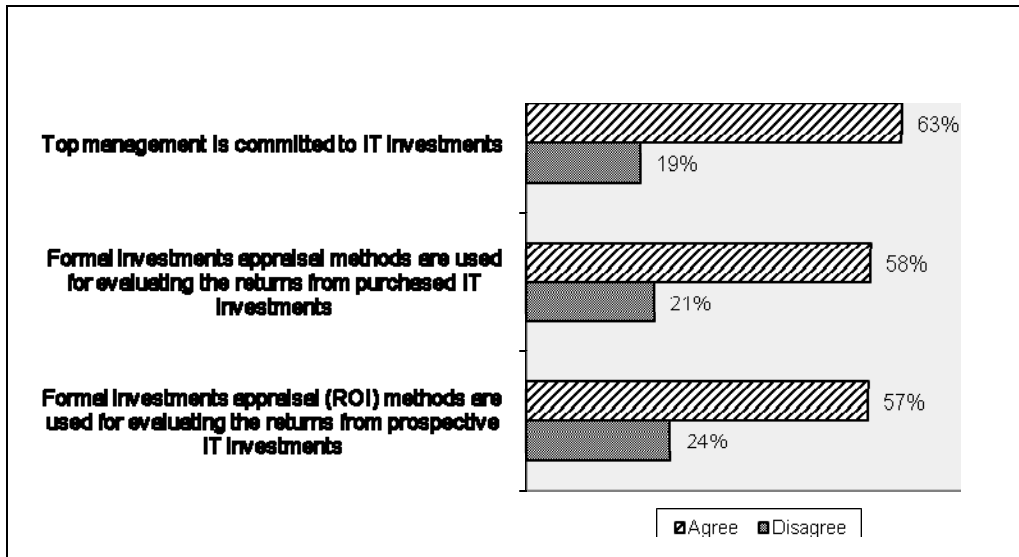
Figure 8. IT investments

4.6   IT Strategic Planning

There have been gaps between Business and IT Planning. Strategic planning of IT is an important area and it has been reported that the level of IT participation in Business planning, alignment of IT and Business, and predominant strategies contribute to the strategic use of IT.

IT participation in business planning:
Kearns and Lederer (2004), and Armstrong and Sambamurthy (1999) reported that IT participation in business planning, alignment of IT and business strategy, and predominating strategies have proved to be the main contributors to the strategic value of IT. Figure 9 shows that 67% participants have access to top management, and have regular informal contacts with the top management. In 64% of organizations, IT staff has frequent contacts with top management, and IT staff regularly attends business planning meetings and contribute to the formulation of business goals (62%). In about 60% of organizations top management has a clearly defined IT role for their company's competiveness.
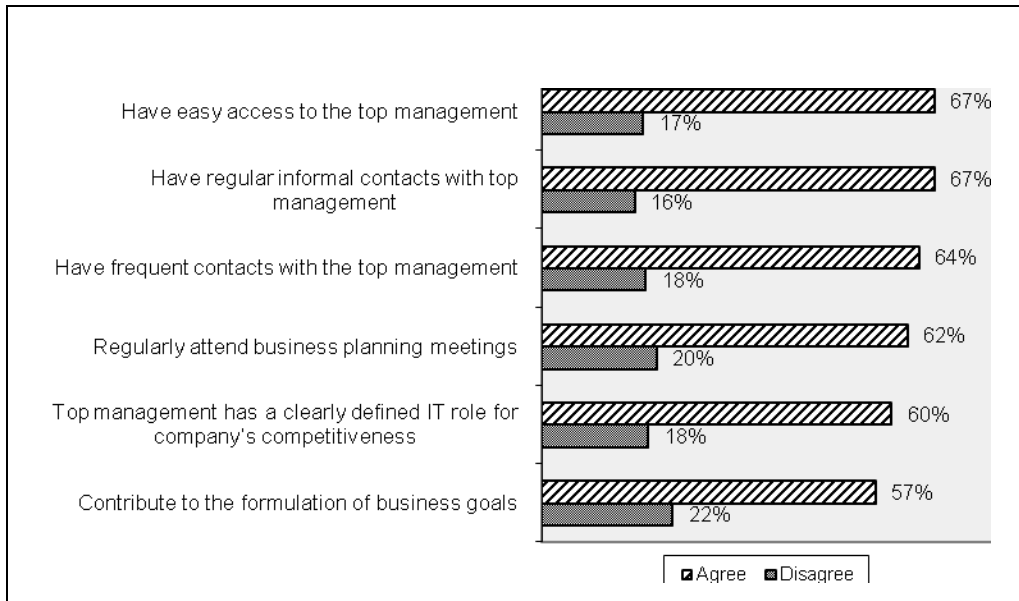
Figure 9. IT participation in business planning

IT-Business strategy alignment:

Alignment of IT and business has been regarded as one of the main contributors to the strategic use of IT. The alignment between IT and business create opportunities that allow IT to be used at a strategic level (Kearns and Lederer, 2000). The results of our survey in relation to the alignment of IT and business strategies in Figure 10 show that in 66% of the organizations IT plan reflects the business plan missions, goals, and strategies. Also, 65% of the organizations agree that the IT plan reflects the business plan resource constraints, and recognizes the external business environment forces. 64% have an overall satisfaction and buying-in of the IT staff for organization's strategic directions, 60% feel that the business plan utilizes the strategic capability of IT, and 59% agree that business plans have reasonable expectations from IT.
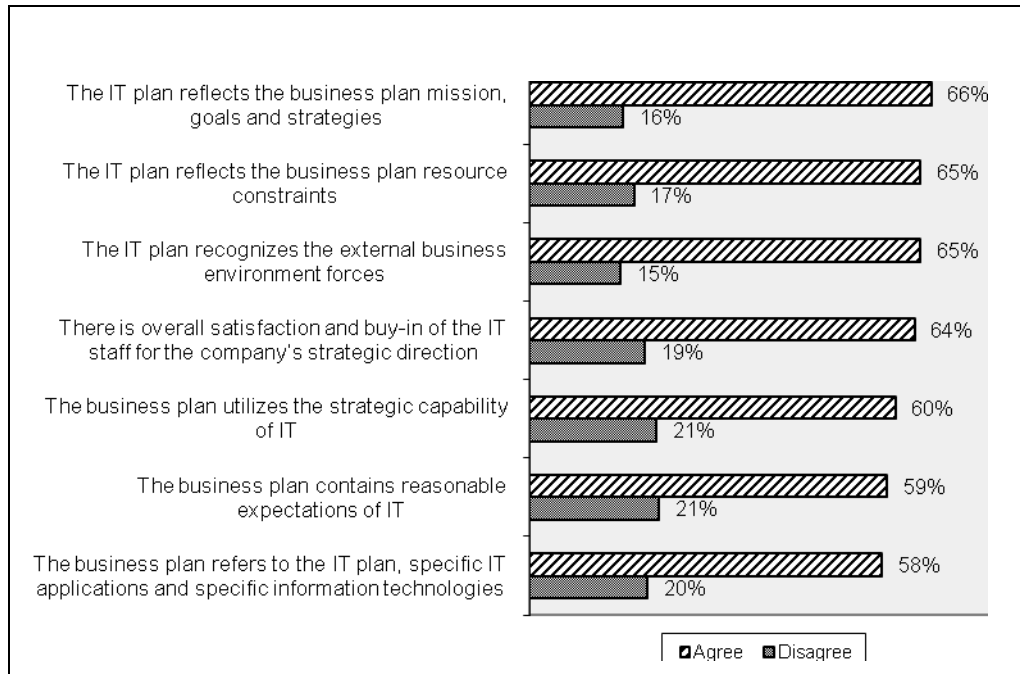
Figure 10. Alignment of IT and Business

Predominant position strategies:

Predominant strategies play an important role in achieving and sustaining the strategic position of an organization amongst their competitors (Armstrong and Sambamurthy, 1999). Figure 11 demonstrates that 72% of organizations have achieved their predominant market position by increasing their relationships with their customers, and 60% by introducing new products and/or services. 56% have achieved that by expanding into new markets, and 55% in acquiring or partnering with other organizations. Due to the nature of these functions being heavily information intensive, and require collaboration across business units and clients, IT inherently plays a strategic role in their operations.
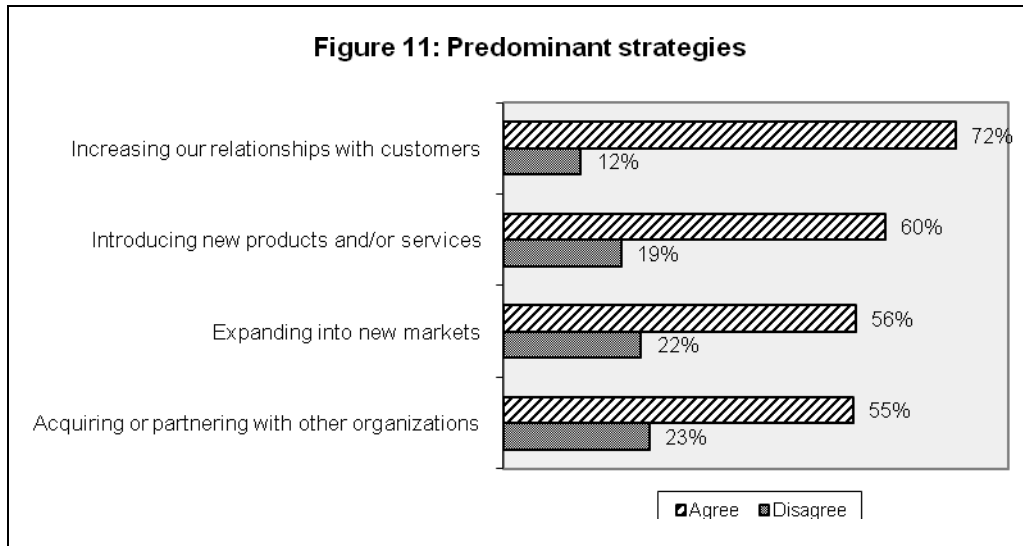
**Figure 11. Predominant strategies**

4.7 IT Support for Business

In this section we have considered business dependence on IT, informed buying of IT services, contract monitoring and contract facilitation.

Business dependence on IT:

IT is becoming an essential component of almost any business to the point that businesses can experience severe financial downside when IT systems are improperly deployed and/or, managed. When IT is used in core business processes, the value of IT increases as it becomes important for its survival and management (Kearns and Lederer, 2004). Figure 12 shows that the daily operations of 81% of the organizations' businesses are critically dependent on IT, whereas 79% of organizations have many critical on-line or batch information systems.
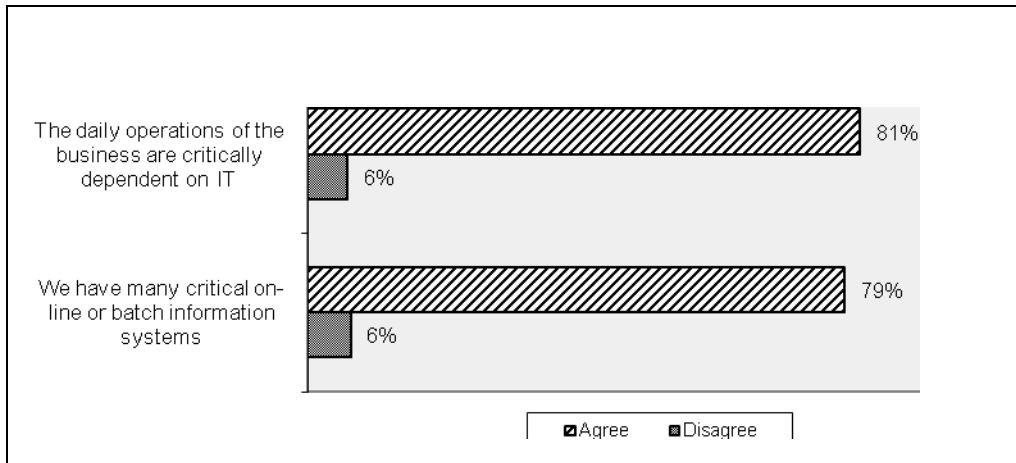
Figure 12. Business dependence on IT

**Informed buying of IT services:**

With the increased use of IT resources, a large number of organizations acquire IT resources and services or outsource them. Several capabilities and skills that organizations need to handle the supply and demand for IT services are defined in this section. In the context of being informed when buying IT services, Figure 13 demonstrates that 63% analyze the nature of service requirements for immediate and long term, 58% oversee contract negotiations, and 56% monitors available service of external suppliers, and 53% of the respondents have structured tendering process.
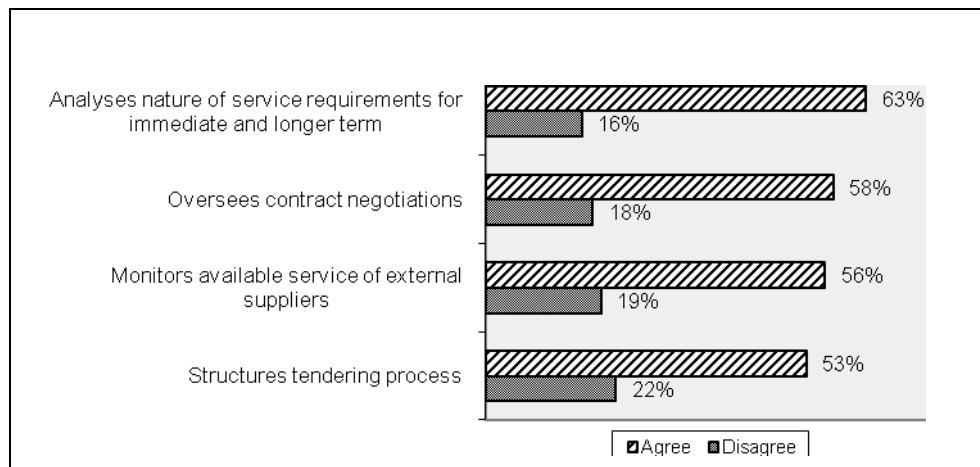
Figure 13. Informed buying of IT services

Contract monitoring:

Contract monitoring ensures that the organization's market position is protected, it assures that the business goals of a contract are achieved (Feeny and WilIcocks, 1998). Figure 14 shows that (66%) of organizations benchmark their existing contracts against similar contracts in the same sector. Approx 56% of organizations monitor contract results against the goals, and 55% negotiate detailed amendments.
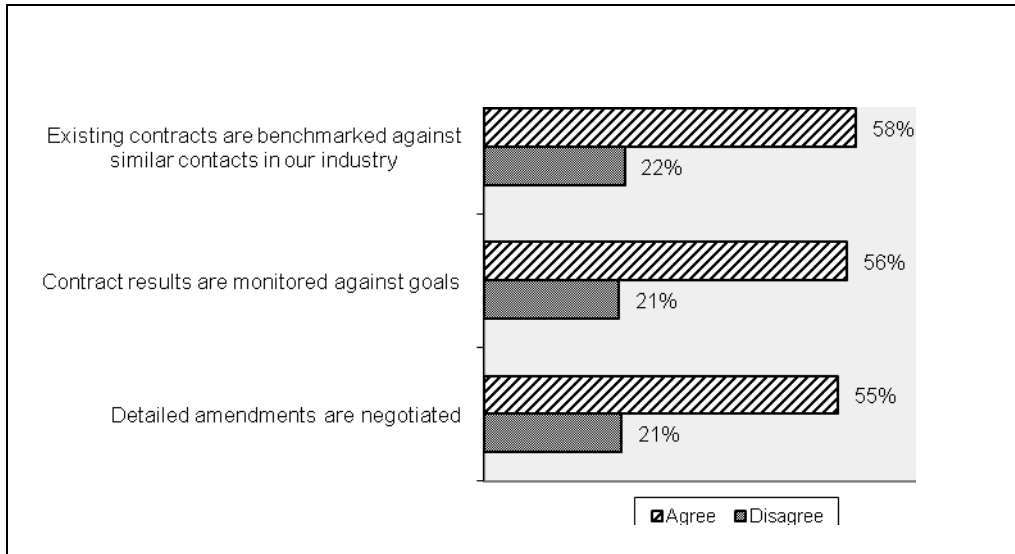
Figure14. Contract monitoring

Contract facilitation:

Contract facilitation attempts to ensure that conflicts are resolved fairly within the long-term relationships between service providing and service receiving entities (Feeny and Willcocks, 1998). Figure 15 illustrates that in 64% of organizations people relationships are facilitated and managed, in 64% business and technical issues are interpreted within an established contract framework, and 61% have processes in place for conflict resolution. All these best practices of contract management positively affect the perspective of the IT value in an organization.
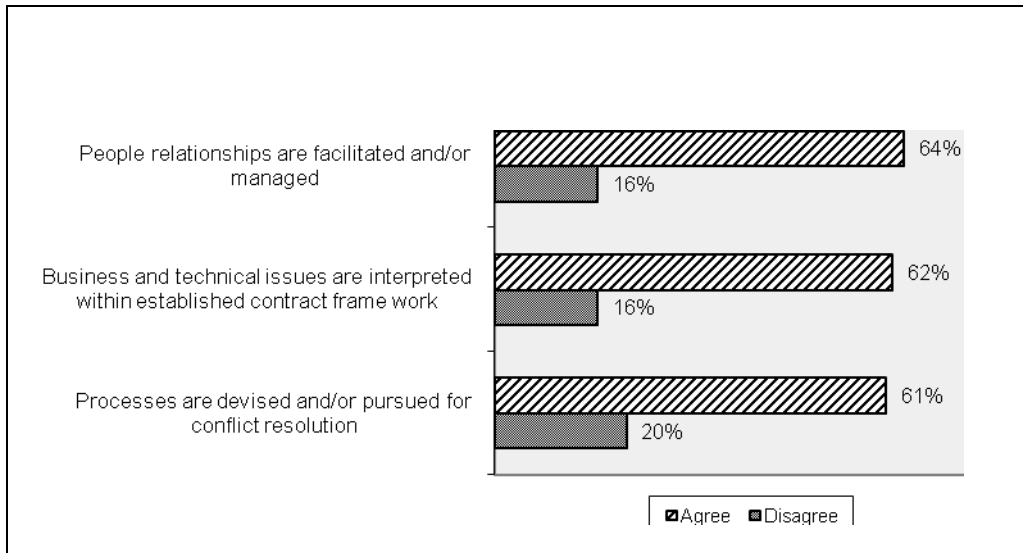
Figure 15. Contract facilitaion

4.8   Tactical Deployment of IT Projects

A large number of organizations manage or outsource the management and deployment of IT projects. Keeping in mind that there are a large number of failed IT projects, this study investigated the importance of IT project deployments. Respondents were asked to evaluate their firm's performance of IT deployment and PM methodologies compared to the most successful organizations in their sector. Figure 16 shows that 64% of organizations assess project success on financials (i.e. Budgeted Cost or Earned Value Analysis), time to deliver, and business value based against the requirements. Also, 59% utilize a Project Management office (PMO) to ensure consistency in all IT projects. Almost 57% utilize formal project management methodology (e.g. PMI or PRINCE2) in their projects. About 55% ensure that all project managers have an industrial recognized level of training and or education (e.g. Project Management Institute's Project Management Professional or PMP). ITIL is increasingly used throughout the world by service management and ITIL practitioners.
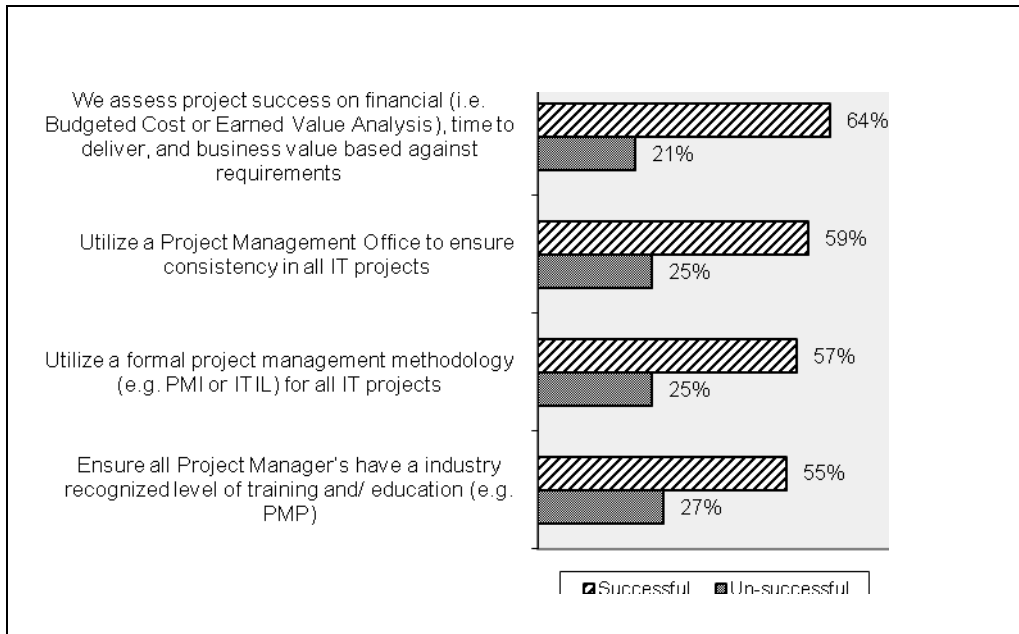
**Figure 16. Tactical deployment of IT projects**

4.9   Competitive Advantage Strategies:

We found that IT support for business and knowledge of senior IT executives play an important role in gaining competitive advantage due to IT.

Competitive Advantage due to IT:

The respondents were asked to evaluate the success of their firm's performance in comparison to the most successful organizations that apply the mentioned strategies for a competitive IT advantage. Figure 17 shows that 67% provide value added services, 64% have established electronic links with their suppliers and customers, and 62% have been successful in leveraging unique firm capabilities, 61% have been successful in creating new products and/or services, 60% were successful in influencing buyer's decision to switch to their products, 58% have been successful in entering new markets, and 57% in achieving advantages such as lower costs or product differentiation as compared to their competitors.
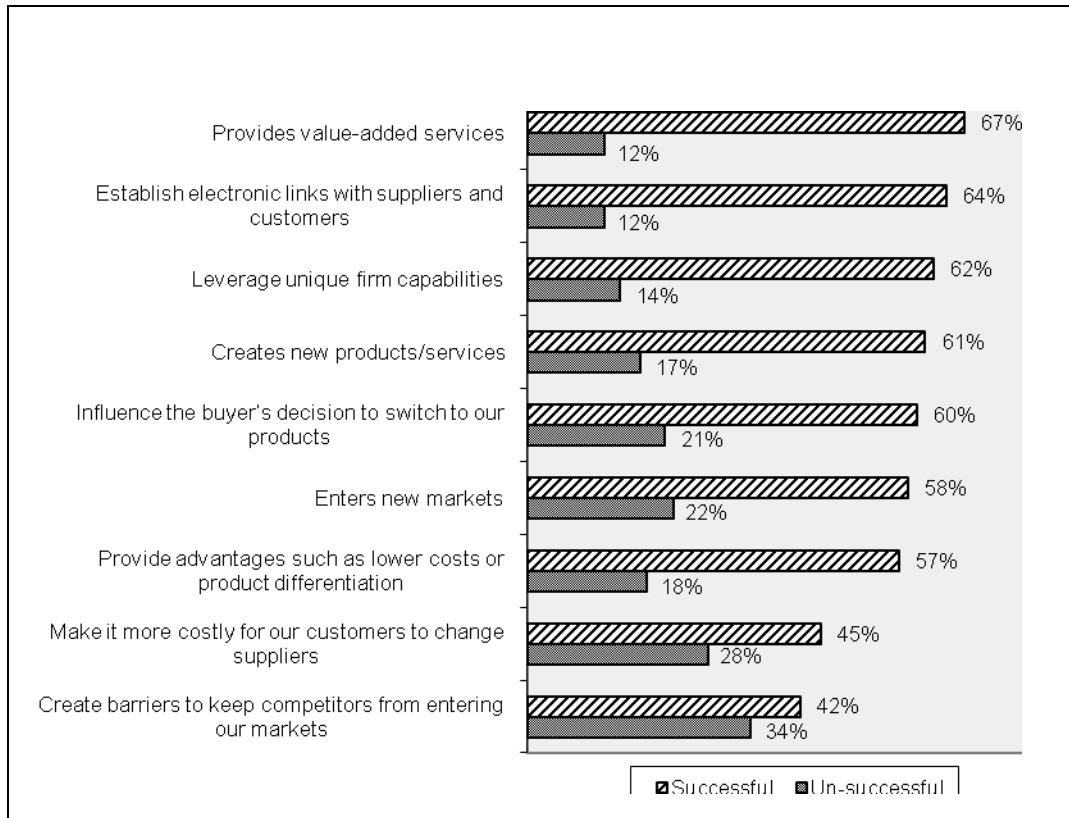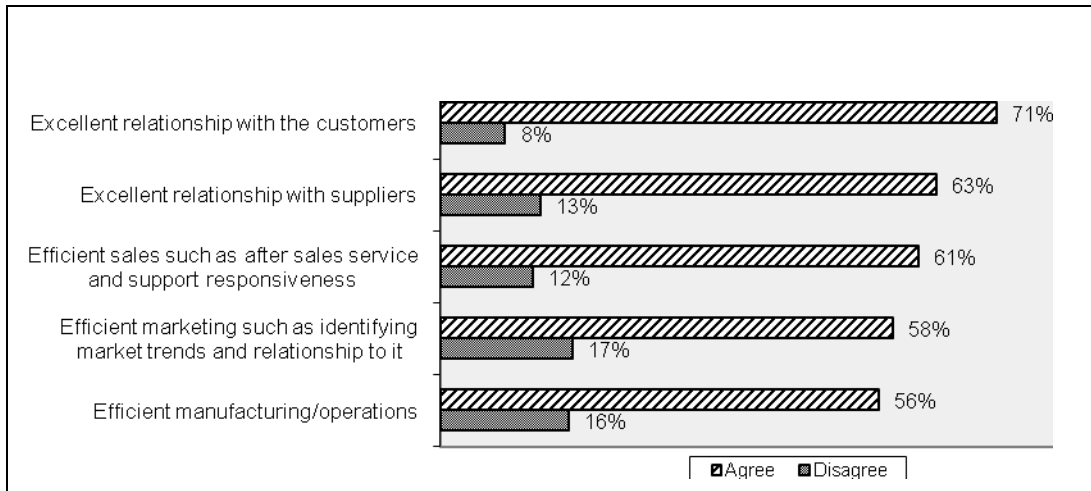
Figure 17: Competitive advantage due to IT

Firm's performance in comparison to their competitors:

In this section of the survey, an evaluation of the effectiveness that various activities have in relation to an organization's competitors was carried out. Figure 18 shows that 71% respondents have developed excellent relationships with their customers, 63% have excellent relationships with their suppliers, and 61% have achieved efficient after/post sales service and support, 58% have efficient marketing, and 56% efficient manufacturing/operations. We assume that those organizations that are using IT supported strategies in an efficient way are gaining competitive advantage over their competitors.

Figure 18: Firm's performance in applying IT

Knowledge of senior IT executives:

Respondents were requested to evaluate the level of knowledge of their firm's senior IT executives that has resulted in a sustained competitive advantage. We can see in Figure 19 that 68% of the senior IT executives in the organization have utilized IT infrastructure of the organization to and their firm's current business needs. About 67% senior IT executives were well informed of their industry's best practices, and 65% senior IT executives have been successful in developing strategies and processes for their firms' present and future products and markets. 61% Senior executives have been successful in identifying relevant emerging IT for supporting firm's products, market business strategies, and business processes, and 61% senior IT executives guide their firm's decisions related to the timing and level of investment in emerging technologies. Also, 61% are knowledgeable about how their competitors were applying IT in their business.
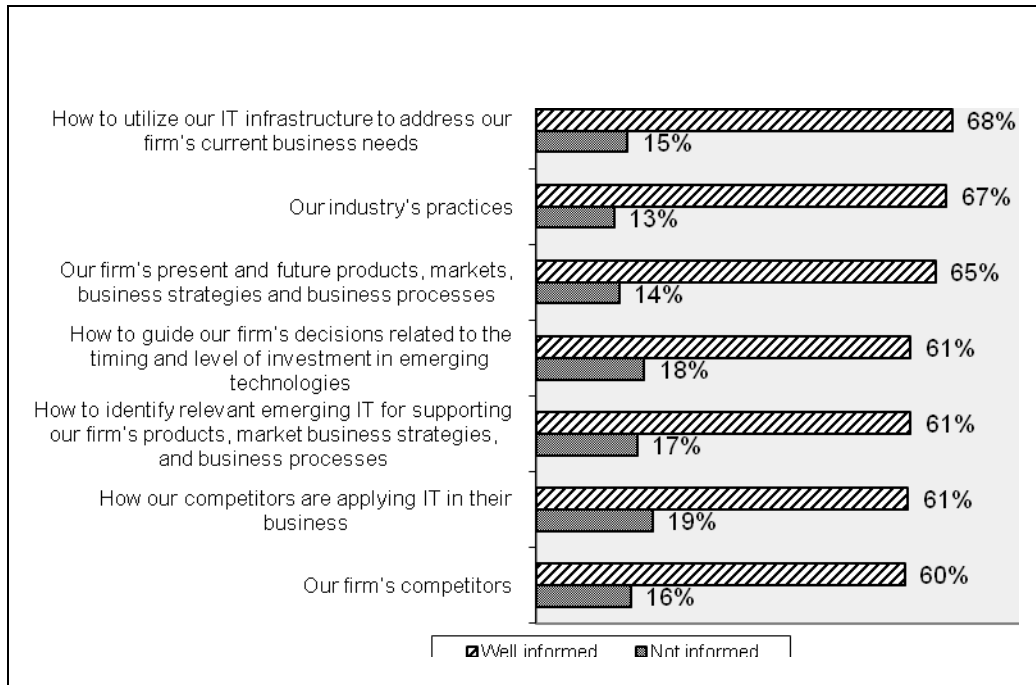
Figure 19: Knowledge of senior IT executives that resulted in sustained competitive advantage

Firm's performance during the past three years:

Measuring IT benefits and value is reported as one of the most important issues for senior IT management (Silvius, 2006). In this section we asked respondents to evaluate their firm's performance as compared to their competitors. Figure 20 shows that 57% of respondents reported that their organizations achieved superior financial performance over their competitors, and 56% have better sales growth than their competitors. The IT managers attribute this in various ways to the strategic use of IT.
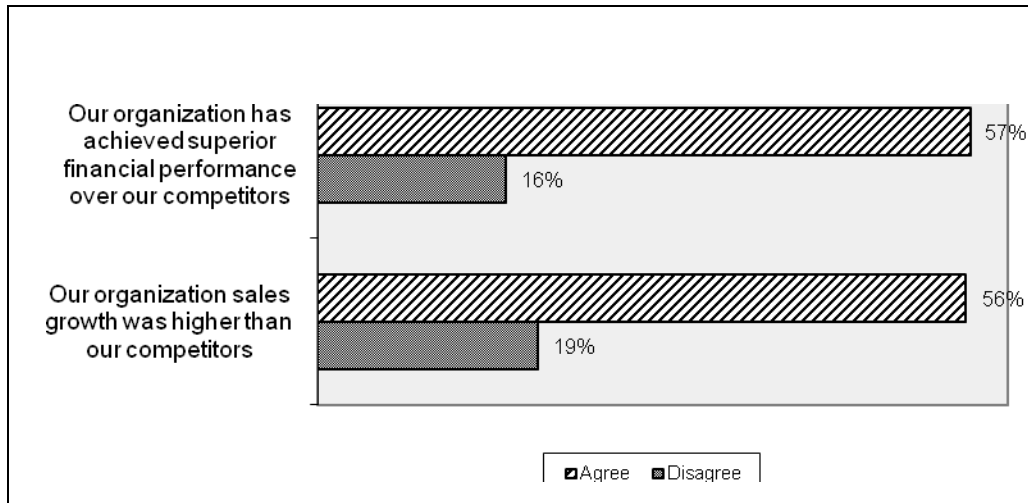
Figure 20: Firm's performance during the past three years

5.0   Conclusions

The results of this study show that organizations realize the strategic value of IT and have adopted best IT practices in order to make best use of IT. This study reconfirms that competitive advantage due to IT not only depend on adequate IT hardware and software but also on a number of other factors. The literature review suggested that most of the IT benefits are either intangible, or indirectly supports the various business functions of an organization, which makes it difficult to directly quantify the benefits of IT. The results of our research study provide an insight into the Critical Success Factors that contribute to the strategic value of IT. We have also included some of the new elements that were not investigated in the previous research. Our paper presents a comprehensive approach in determining Critical Success Factors that contribute to the strategic advantage of IT.

Our results show that majority of organizations have suitable IT human resource capability and adequate IT infrastructure. Organizations use their information assets effectively. Organizations are aware of the importance of relationship between IT and business, and use formal and informal channels to utilize it for strategic use. We found that competitive business strategies together with competence of senior IT executives are most important factors in creating strategic advantage due to IT. The other important

factors include IT human assets, innovativeness, knowledge management, partnership between IT and business, alignment of business and IT goals and IT support for business. These factors contribute to the competitive and strategic advantage of IT.

Results of our study show that a vast majority of senior IT managers regard these factors as important for the success of an organizations. The results of the study have also shown that the identified Critical Success Factors are relevant in the current economic situation and contribute to the better performance of the organization over their competitors, and hence provide strategic advantage to organizations. The results of our study suggests that organizations can reap benefits of IT, if they take a comprehensive approach in utilizing IT Critical Success Factors in a concerted way while incorporating industry best practices. IT and Business Managers can use the IT CSFs Framework developed in this study to focus on these CSFs in order to utilize IT for strategic and competitive advantage.

6.0   Limitations and suggestions future research

This study was an exploratory study to identify Critical Success Factors that contribute in the strategic use of IT and to test those factors empirically. Although the results of the study are based on a sample of 220 organizations; they represent a wide cross-section of industries and businesses in USA. The results show a general trend of use of IT best practices and Critical Success Factors in the sampled organizations in USA. The results should be interpreted or used with these perspectives in considerations. The survey results are based on the opinions of senior IT managers, therefore the results may be biased to their subjective opinion. Senior managers may have presented a rosy picture while the reality may be somewhat different. A future study may include other people who use or are involved in IT from the same organization. Also, a future study may investigate the influence of culture and politics in organization decisions that are made in relation to the investment in IT as a strategic factor.

7.0   Acknowledgements

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