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Title

A FRAMEWORK FOR IC-TECHNOLOGY ENABLED SUPPLY CHAINS

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Abstract:

In lieu of a profound research interest on the growth pattern of financial commitment and deployment of large scale monetary resources on Information Technology within organisations, Information and Communication Technology personnel and strategic planners are increasingly demanded to rationalise investments on IC-Technology enabled solutions. This is to cite that, there is a notion that corporations not only maximise the profits of embracing IC-Technology but also can avoid many inherent and non systemic risks (Political, Economical Social, and Cultural) that are an offshoot of rapid technological transformation.

This research is framed within the present trends in strategic management of IC-Technology – with a keen objective to maximise IC-Technology advantages. The study is based on a recent pilot study of a focus group of a number of organisations representing various industries as part of a larger study to understand the key relationships among Supply Chain Management, IC-Technology and Strategic Planning. This study is limited to the IC-Technology review and looks at latest developments in the adoption of (and financial investment on) IC-Technology - which has yielded in an ever-increasing focus on the patterns in which IC- Technology solutions are ideated for and embraced.

In the background of a brief review of ideation approaches, the study outlines many of the pilot study yields that were mentioned earlier. Initial results indicated that on the normative, many organisations did not adopt a formal procedure for strategic planning for and the governance of IC-Technology initiatives.

Key Words: Technology Management, Strategic Management and Planning, SCM, IC-Technology.

I. Introduction:

As of date, adoption of Information and Communication (IC) Technology plays a prominent role in both social and economic development. An ever expanding spectrum of IC-Technology

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solutions and internet technologies is powering the world towards a substantial transformation of almost all business processes on a global scale.

The competitive drive of the corporate sector has scaled businesses into the technological world. Many corporations worldwide reckon that IC-Technology is deemed essential for the building of competitive businesses, in the management of global corporations, in adding business value and in providing useful products and/or services to their potential customers (Kodama, 2002).

In the past 10 years or so, capital investment on IC Technology has become a large composition of capital expenditure (within many corporations). Within the European Continent, capital outlay on IC-Technology equipment and infrastructure in 2005-6, is estimated to have scaled $1.72 trillion (Lauden & Lauden, 2006; Lauden & Lauden, 2005). The composition of IC-Technology capital expenditure scaled from 18.76 per cent (of consolidate investment) in 1980 to 35.23 per cent in 2003 (source: European Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts).

As budgeted investment in IC-Technology within the industry continues to ameliorate, there is an assertion that IC-Technology managers and strategists rationalise investment on Information Technology. These personnel are required to not only capitalise on the benefits that are featured (through the adoption of IC-Technology's and other technological solutions) but need also to avoid the many pitfalls and PESC risks (Political, Economical, Social and Cultural) that are integrated with rapid technological enablement. As of date, the bottom line of planning for IC-Technologies is to maximise return on ICT capital investment – often achieved through the combustion of the application of IC-Technological solutions with that of an organisation's business strategy.

Over the past few years, many academics, technological theoreticians and renowned strategists have created and proposed proven frameworks to facilitate process orientation of organisational strategic planning for technology. Even so, it is challenging to assimilate if organisations actually do consider a formal processes or proven frameworks while planning to embrace IC-Technology.

In late 2008-09, a major research study was initiated to:

- Aid the development of a deeper understanding of the strategic value of IC-Technological answer within the current trends concerning the process of developing IC-Technological plans within logistical organisations (within Visakhapatnam, AP, India).

- To assess the success quotient (e.g. to optimise funding of IC-Technologies) of factored strategic planning for IC-Technologies.

- Identify key areas where IC-Technological planning processes can be reviewed - so as to add value to operations, improve the decision making procedure and optimise investment on technology and allied products/services.

This research study is based on the outcome of a pilot study (of a representative sample group of SCM organisations) as outlined above.

The research methodology for collecting data included: Literature Review - To identify latest research on end-to-end practices and frameworks for IC-Technology strategy planning (and the alignment of technological objectives with that of the business strategies).

Formal interviews of IC-Technology directors, Managers, CIO's, CTO's and board room strategists within the focus group – to help in the establishment of actual IC-Technology planning practices.

II. Literature Review: Planning for IC-Technology as a Strategic Tool:

As discussed previously, increased expenditure on ICTs has resulted in multiple challenges addressed by IC-Technology directors and other strategists - as they are required not only to validate and justify expenditure on IC-Technology but also to maximise the benefits that are reaped through the adoption of technology. The attained success in maximising return on IC-Technological investment is often achieved by inculcating strategic management process before adopting IC-Technology solutions and the preparation of strategic IT plans.

Successful organisations depend heavily on strategic IC-Technology plans which integrate corporate performance to the organisation's broad business goals. More broadly, if an organisation adopts the application of technology by improving and fine tuning operational performance functions, then managing IC-Technology strategically indicates that the IC-Technological strategic plan complements and strengthens the strategic operational plans

(SANGONet, 2001). Embedded within organisations, these two divergent plans represent the overall corporate strategic plan.

Managing IT systematically demands (example, SANGONet, 2001; Asgarkhani, 2003a) for an integrated cum holistic approach to the management of work. This study views the key objective of ICT strategic planning as being "to work and achieve the corporation's need for information directs its framework for the management of IC-Technologies" (SANGONet, 2001; Levy, Powel & Yetton, 2001).

Many researchers and strategists advise that strategic planning process for IC-Technology can encompass of three phases – viz., strategic analysis, clear choice of strategies and procedural strategy implementation (Asgarkhani 2005; Board, 2001; Newman, 2002; Parkinson, 2005; Benson, Bugnitz & Walton, 2004). These researchers suggested that the outcome of this three tiered cycle process should preferably be spun in a hierarchy that clarifies the mission, objectives, strategies, procedures and decisions followed by an operational and action plan. This tiered hierarchy in itself is often referred to as a structural framework/model for comprehensive strategic planning.

Irrespective of the methodology that is adopted to develop an IC-Technological strategy plan, varied organisational culture (e.g. advantage of cost, creativity, determination and growth) and allied forces that comprise of business strategies (e.g. coordinated planning, cutting edge technologies and IC-Technology as a scarce resource) could influence the IC-Technology planning procedure (Benson & Standing, 2002; Benson et al, 2004; Boar, 2001). There are the multitudes of models for drafting IC-Technological plans – examples include:

- Structures that focus on effect of planning – such as Business Impacting and Business Aligning.

- Empirical formulations that emphasize on the primary planning process – such as hierarchical, reverse hierarchical and Eclectic.

Other approaches to future strategy planning could include:

- Business Goal-oriented planning – non-conducive in nature, more often than not hampers fitment of the IC-Technology plan with the overall business strategy.

- Situation demand-based IC-Technology strategy – arbitrary and fails in giving consideration to the overall information input need of the corporation.

- Strategizing for IC-Technology in parallel with the business objectives (almost identical however, not quite as the same as business alignment)

3. Study Design and Research Methodology:

The objective of this interdisciplinary study (objectives detailed in section four) is to prove that there exists a quantifiable understanding in non-unique trends and methods concerning the segment of strategic planning and the management of IC-Technology within Corporations. This research involved studying and analysing the common strategies and IC-Technology management routines within a representative sample of over twenty companies within the North Coastal Region of Andhra Pradesh, India.

This research is based on a formal non-quantitative approach. Delphi sets were introduced and the posed questions were identified based on an in-depth literature review (of proven practices and collated structures for IC-Technology related strategic planning - and an alignment of IC-Technological plans with key business formulations – as discussed in section two) and a non-formal workshop comprising of twelve database administration and technology managers.

4. Identifications: The Ground Reality of Strategic Management of IC-Technologies:

This segment provides a summative result of this work study on the Delphi group cited earlier. Technology Personnel from MNC's who participated in this focus group represented various industries, which included Pharmaceutical Carrying and Forwarding Agents, IT Solution Renderers, FMCG corporations, Consumer Electronics, Education, Research and Development, Media and Entertainment Corporations, Critical Health Care, Panchayati Raj (Local Government), Power Corporations, and Bulk Drug Research Corporations.

Many corporations (barring two) had less than 960 employees. According to the central governmental classification, these corporations classify as Medium Small Medium Enterprises

(SMEs). Most companies within the focus group felt that the sheer size of the corporation does not justify investment and the enablement of support for comprehensive strategic IC-Technological plans – barring instances of offshore trading.

The mean number of IC-Technology staff is estimated to be one per eighty total staff of the corporation. Most corporations felt that in lieu of the high cost of IC-Technology employment, comprehensive strategic planning should result in maximised value addition from IC-Technology staff. This argument is very stable with theory as discussed in the preceding section. Country population, customer base and the geographical spread of latent customers are important factors in structuring an organisation's IC-Technology strategy. Many participating corporations had a registered consumer base of less than 49,000 – with one company adhering to the laws of a Griffin paradox with about 1,46,371 customers. The results assert that many firms had to be bothered with a relatively small consumer base that is often established over large latitudes in area.

The participants of the workshop group were inclusive of both for-profit and not-for-profit organisations. In many corporations, the IC-Technology group (section) was chaired by an Information Technology Manager cum director (67.79 per cent), a CIO (8.11 per cent) or a general manager (7.61 per cent), 19.76 per cent of the corporations did not employ traditional structures or designations for the pattern in which IC-Technology operations were executed (i.e., Computer Sciences is overseen by the corporation's GM, a strategic unit head or by a project leader on a one-on-one basis). It is pertinent to note that, there exists a 2.12 per cent overlap referencing the primary and the 3rd set (Illustration 1).

Many IC-Technology groups within the undertaken sample (62.91 per cent) rolled-up to the corporation's GM or the CEO. That is to emphasize this study assertion that, the IC-Technology segment is identified as a robust strategic business unit (in its established functionality) – which can impact a corporation's capability to contest within an oligopolistic market structure. This indicates the elevated importance of the functionality of IC-Technology within large corporations. 18.82 per cent of corporations had their IC-Technology team to report to the chief of financial affairs. This is attributed so in lieu of mission critical applications amidst the corporation which are mostly regulatory associated financial applications. Added to this, the IC-Technology section is originally made functional to auger and support finance related

applications. The remainder of the corporations had multiple arrangements as an in-time reporting structure of the IC-Technology segment within the corporation.

Figure 1: Who leads the IC-Technology Group ?
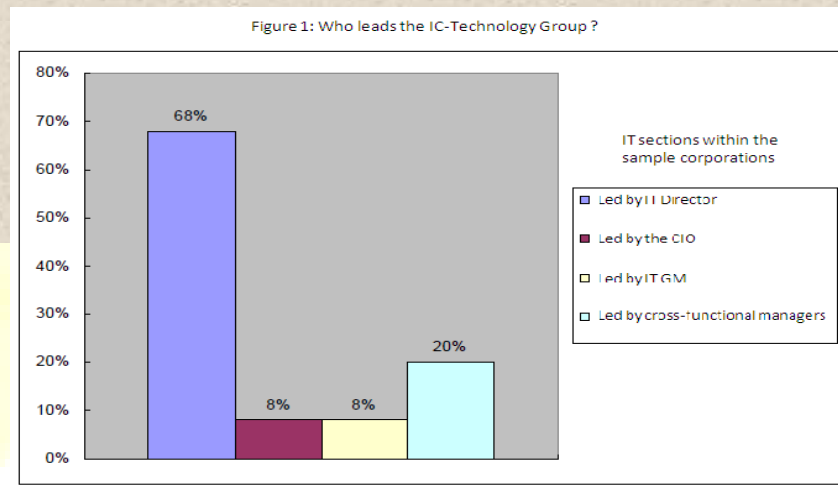
The strategic position of IC-Technology solutions within a corporation varied by a large mean – as reflected in illustration 2. Technical assistance for business systems seems to have a relatively higher score (90.69 per cent). On the whole, it seems that many corporations view the role of IC-Technology within a technical purview – as only 5.96 per cent attested the IC-Technology sections as being able to render advice to auger planning for the application of technology within the corporation. In a nut shell, upto 62.69 per cent in the sample corporations the position of IC-Technology is strategic, the department's function is broadly limited to the available technical and functional support.

Strategic and functional systems within corporations vary by a large mean. 35.86 per cent of the corporations indicated that the most important and vital IC-Technology solutions that were implemented needed to establish protocols and ameliorate and channelize communication. A total 32.16 per cent specified that from a variety and multitude of systems and applications financial applications were excluded and 23.81 per cent opted financial applications to be strategic in nature (Illustration 3).

On the whole, 76.32 per cent of the sample corporations voted that IC-Technology governance is extremely critical to the future of IC-Technology within the corporation. On the contrary, only 59.32 per cent registered and employed some basic steps of governance (for the allocation of the portfolio of IC-Technology projects). A total of 10.38 per cent of the sample viewed that ICT

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governance is not really important and sustainable and another 15.32 per cent did not offer any opinions or comments.

Figure 2: Role of IC-Technology applications
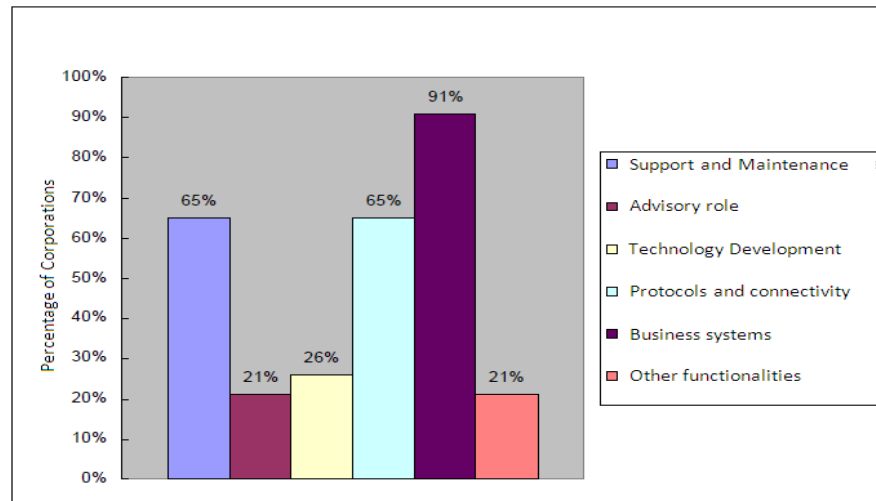
A total of 79.32 per cent of the corporations in the sample group did not implement or follow a structured framework for IC-Technology planning. Moreover, almost all organisations acceded that strategic planning for IC-Technologies needs to be styled along business objectives.

The timeframe for a typical IC-Technology strategy plan was between 18 to 36 months. About 25.92 per cent of the sample corporations considered a strategic planning structure that exceeded 36 months. 36.92 per cent viewed at a 2.2 to 3.1 year ideation period. The remaining corporations planned for 7 months to 14 months. Over the last couple of years, the plan span for IC-Technology has been sufficiently rationalized to account for the ever-increasing pace of IC-Technology development.

Corporations were required to rate the value of and the assistance obtained for strategic planning for IC-Technology. Illustration 4 reflects the results. On the whole, many corporations value systematic strategic planning. Added to this, 76.21 per cent trusted that there is a fair amount of support given for planning activities.

In many corporations (52.71 per cent), the planning procedure was ideated by the IC-Technology section or IC-Technology project teams. Approximately within 29.64 per cent of the sample corporations, line managers ideated and led the planning function. A set of the variables that

influenced the procedure of planning (or shortage of planning) are provided in illustration 5. As specified earlier in this section, variable "cost" is most influential.

Figure 3: Critical IC-Technological Solutions

Figure 4: Assistance rendered for Strategic Planning

Figure 5: Variables that influence Strategic Planning
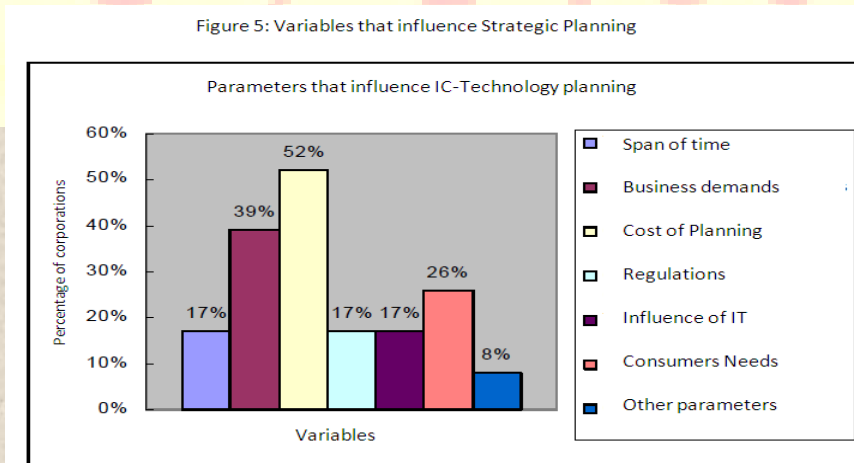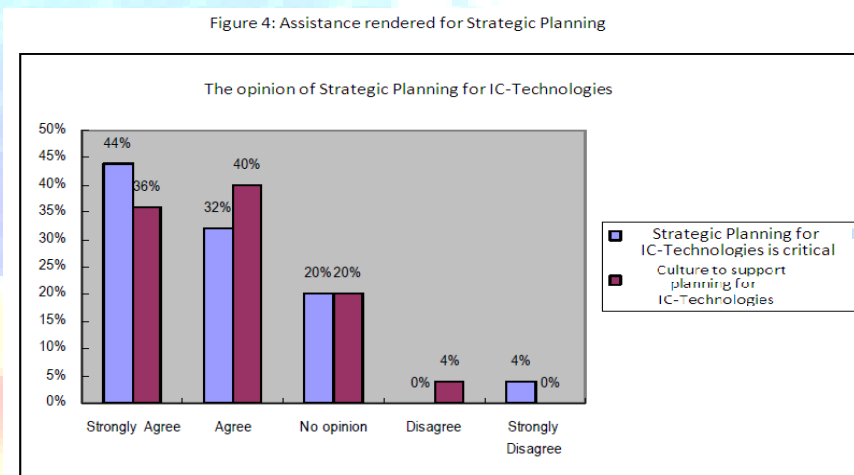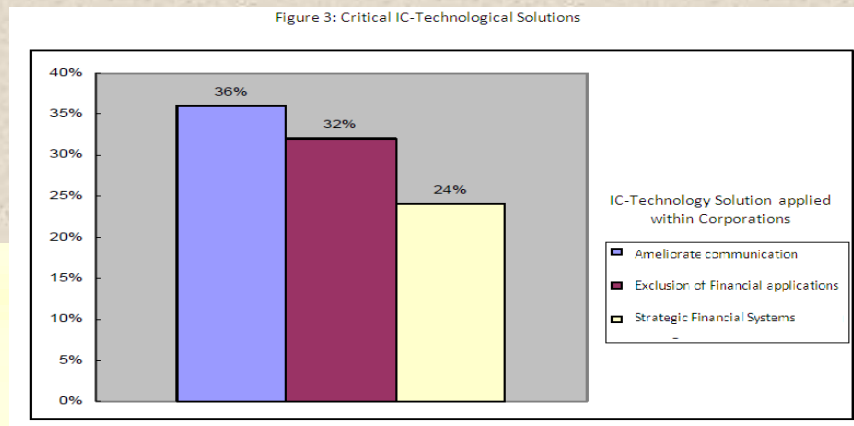
Corporations identified various critical phases that relate to the strategic planning process. 44.31 per cent percent of sample participants identified that assimilating the current situation and access to precise information for the analysis of latest situation as being more critical in the various phases of the strategic planning cycle. Architectural design was opted as being a critical stage by 28.11 per cent of the sample corporations. 11.74 per cent of the sample identified that the phase of implementation as the most important phase. 7.67 per cent gave no opinion and another 7.79 per cent identified a different set of the critical phases of the planning function.

Corporations were asked to opine on the patterns in which they assess the effectiveness of their IC-Technology strategy plans. An overwhelming, 42.11 per cent did not assess efficiency and effectiveness of their IT projects at all. 24.97 per cent weighed users mandating as a method of analysing the success of strategic planning. Another 25.36 per cent applied financial measures to check the value of IC-Technology planning. The rest (approximately 7.59 per cent) applied a combination of other routes.

5. Summary and Conclusions:

The structure of IC-Technology strategic planning (as executed out within the corporations that participated in this workshop group (DELPHI)) seemed to be ideologically different from related theory - as specified by numerous researchers and IC-Technology strategists worldwide and reported in one of the previous sections. This is especially because North Coastal Andhra Pradesh SCM Corporations are mostly MSMEs (smaller organisations compared with companies in other parts of India or abroad).

In short, the corporations that participated in this workshop is a representative sample of various portfolios including Pharmaceutical Carrying and Forwarding Agents, IT Solution Renderers, FMCG corporations, Consumer Electronics, Education, Research and Development, Media and Entertainment Corporations, Critical Health Care, Panchayati Raj (Local Government), Power Corporations, and Bulk Drug Research Corporations..

On the whole, corporations viewed IC-Technology solutions as being quintessential to the addition of value to business and results in improved competitiveness. IC-Technology was

placed as a catalyst for creativity that would permit corporations to streamline process orientation and render better service within the bilateral structure of an international market.

Referencing the process of planning, very few sample participants observed a methodical strategy-planning structure. Many corporations performed IC-Technology planning to an operational extent only. Strategic planning for IC-Technology was voted as a high cost decision - where IC-Technology line managers and senior management were required to justify the expenditure to the board of directors.

Many systematic planning programs appeared to have been rooted on a "straight hierarchical" strategy. The IC-Technology governance was valued but seemed to be quite informal. It looked as though many corporations did not measure the efficiency of their planning structures.

The results of this research are not yet final on a comprehensive note, although it seems that almost 2/3rd of the corporations studied may actually reap benefits from not only ameliorating their IC-Technology planning procedures but also by applying place mechanisms for the evaluation and assessment of the efficiency of their basic attitude to strategic planning.

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List of Acronyms used:

AP – State of Andhra Pradesh, India

B2B - Business-to-business

B2C - Business-to-consumer

CFO – Chief Financial Officer

CIO – Chief Information Officer

CTO – Chief Technology Officer

C2B – Citizen-to-Business

C2G - Citizen-to-Government

DEC - Development Economics

GDP - Gross Domestic Product

GPT - General Purpose Technologies

IBM - International Business Machine

ICANN - The Internet Corporation for Assigned Names and Numbers

ICT - Information and Communications Technologies

IFC - The International Finance Corporation

ILO - International Labour Organisation

InfoDev - Information Technology for Development

IT – Information Technology

ITU - International Telecommunication Union

MDG - Millennium Development Goals

MNC – Multi National Corporations

MSC - Multimedia Super Corridor

IMF - International Monetary Fund

NASSCOM - National Association of Software Companies

NGO - Non-governmental organisation

OECD - Organisation for Economic Cooperation and Development

R&D - Research and Development

SCM – Supply Chain Management

SME - Small and Medium Enterprise

TFP - Total Factor Productivity

TQM - Total Quality Management

UNDP - United Nations Development Program

WSIS - World Summit on Information Society