
USER INVOLVEMENT IN INFORMATION SYSTEMS PLANNING LEADS TO STRATEGIC SUCCESS: AN EMPIRICAL STUDY

Ramraj Palanisamy

Sushil

This paper presents empirical findings for relationship between user involvement in Information Systems (IS) planning and strategic success of IS. User involvement has been considered in two stages of IS planning. In strategic planning of IS, information requirements analysis and architecture are considered as the two stages. For strategic success of IS, IS enabled organizational change, IS enabled competitive advantage, and IS enabled organizational learning are considered. Field generated measures for the strategic success of IS were developed by idea engineering. Hypotheses are formulated to test the relationship between user involvement and IS strategic success variables. Empirical data was collected by a questionnaire survey to test the hypotheses. IS users and planners participated in the survey. The survey covered 42 organizations from eight sectors with a sample size of 296. Respondent's relevance for the survey was ensured. Scales table describing the dimensions of user involvement and IS success was used to synthesize the responses. Univariate results for research variables are presented in optimistic, most likely and pessimistic scenarios. The dimension-wise values of a variable are given to gain more insight into the status of user involvement and IS strategic success in the surveyed organizations. Mixed results were obtained in hypotheses testing. The results of statistical testing on the research hypotheses show that user involvement in IS planning influences IS enabled organizational change and IS enabled organizational learning but doesn't show a significant relationship with IS enabled competitive advantage. The study also shows user involvement in one stage of IS planning influences the level of participation in the subsequent stage.

INTRODUCTION

Blumenthal (1973) and Bowman *et al*, (1983) proposed a three stage model for information systems (IS) planning; the stages are strategic planning of information systems, organizational information requirements analysis and architecture and resource allocation. The major activities in strategic planning stage are assessing organizational objectives, reviewing business strategies, setting IS mission and setting IS policies. IS planning at the strategic level is a process of identifying a portfolio of computer based applications to assist an organization in

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executing its current business plans and thus realizing its existing business goals (Lederer and Sethi, 1992). Also IS planning helps organization to use IS in more innovative ways to build barriers against new entrants, change the basis of competition, generate new products, and build in switching cost (Porter and Millar, 1985). The second stage of organizational information requirements analysis includes the estimation of the current and projected information needs to support decision making and overall information architecture. Resource allocation stage contains plans for hardware, software, data communication facilities, personnel and financial plans.

IMPORTANCE OF IS PLANNING SITUATION

The increasing strategic impact of IS on the business, increased investment in IS (Niederman *et al*, 1991), evolving role of IS for different purposes in the organization (McFarlan *et al*, 1983) made the IS planning process as one of the key issues among the organizational processes (Earl, 1989.) Studies explored that among the IS issues, IS planning has been ranked as the most important one (Teo *et al*, 1997; Palvia and Palvia, 1992) and the process of IS planning affects the environment through strategy, firm and industry (Parsons 1983).

IMPORTANCE OF USER INVOLVEMENT IN IS PLANNING

The prominent actors involved in IS planning process are user, planner, and top management (Moynihan, 1990). Top management wants a more effective and systematic planning process for IT with better involvement of users (Premkumar, 1992). A successful information systems plan is an implemented information plan where the whole hearted participation of the personnel affected by the system is necessary (Igbaria and Guimaraes, 1994). The studies based on empirical inputs from large organizations (Baronas and Louis, 1988; Tait and Vessey, 1988) and small organizations (Montazemi 1988) established a positive impact of user involvement on IS implementation success. The major setbacks in the IS planning practices are lack of linkage between business and IS, lack of user commitment to IS planning and the volatile environment (Lederer and Mendelow, 1987). As systems are developed for the users, involvement in the planning phase

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facilitates successful implementation of plans (Premkumar, 1992). Dutta (1996) concluded that active participation and involvement of business users and managers in IS planning process helps to align IS with business.

IS STRATEGIC SUCCESS

Ein-Dor and Segev (1981) give five criteria to measure IS success viz. profitability, applicability to major organizational problems, quality of decision or level of performance, user satisfaction, and widespread use. User information satisfaction was considered as the surrogate measure of IS success (Yap *et al*, 1992; Delone and Mclean, 1992; Doll and Torkzadeh, 1991). The other measures are level of system usage (Adams *et al*, 1992) improved decision quality and performance, business profitability and improved productivity (Bailey and Pearson, 1983). At strategic level IS success can be considered by IS enablement for organizational change, IS enablement for competitive advantage, and IS enablement for organizational learning. A significant positive relationship has been found between user involvement and system success (Igbaria and Guimaraes, 1994).

NEED FOR THIS STUDY

The studies on user involvement were administered in the phases of IS development, but rarely empirical studies are seen for user involvement in IS planning, though it has been emphasized as a necessity for implementation success (Premkumar, 1992; Jarvanpaa and Ives, 1990). User satisfaction and IS usage were considered as the surrogate measures of IS success, but at the strategic level, field generated measures for IS success are lacking in the literature. Effect of user involvement in IS planning on IS strategic success has not been convincingly demonstrated.

Hardly studies are available to gain more insight into the dimensions of involvement viz. control, responsibility, advice, and symbolic. Similarly studies on the dimensions of IS success such as organizational enhancement, decision effectiveness, improved productivity and cost reduction have not been explored much.

MODEL FOR USER INVOLVEMENT IN INFORMATION SYSTEMS PLANNING LEADS TO STRATEGIC SUCCESS

Figure 1 shows research model proposing the influence of user involvement in IS planning on strategic success of IS. First two stages of IS planning described by Blumenthal (1973) are considered for user involvement. To limit the scope of the study, resource allocation stage is not included. Accordingly user involvement is considered in strategic planning of information systems and information requirements analysis (IRA) and architecture. The model presupposes that user involvement in one stage affects the involvement in the subsequent stage; accordingly users who are involved in strategic planning of Information Systems will show more involvement in the subsequent stage of information requirements analysis and architecture.

IS strategic success variables are considered as dependent variables (outcome); and user involvement variables are assumed as independent variables. In other words user involvement variables are proposed as antecedent variables. The model proposes that involving users in strategic planning of Information Systems will increase the possibility of strategic success of information systems; similarly involving users in IRA & architecture will increase the possibility of strategic success. User Involvement in IS Planning Strategic Success of IS

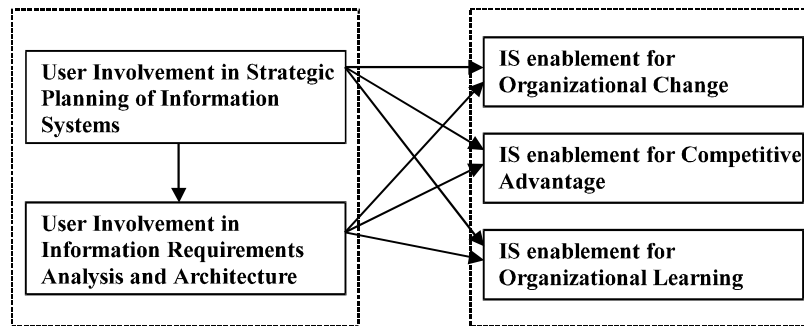


Figure 1: Model For User Involvement in Information Systems Planning Leads To Strategic Success

USER INVOLVEMENT IN IS PLANNING

USER INVOLVEMENT

In the IS context user, involvement is a subjective psychological state of the individual user in terms of importance the user attaches to a given system (Barki and Hartwick, 1989; Jarvenpaa and Ives, 1991). User influence (Edstrom, 1977), participation in the IS process (Ives and Olson, 1984), systems analysis activities by the user (Doll and Torkzadeh, 1989; Baroudi *et al*, 1986), user's role to attain the IS goal (Swanson, 1974) are also treated as user involvement in literature.

DIMENSIONS OF USER INVOLVEMENT

Users can be involved in strategic planning of IS by inviting them for consultations (consultative), or by having user representatives in IS planning team or steering committee (representative) or arriving at a user led consensus in the IS planning decisions. In no involvement situation users are unwilling or not invited to participate in IS planning; in symbolic involvement user's input is requested but ignored in the IS plan; in involvement by advice user's advice for IS planning is solicited through interviews and questionnaires (Lucas, 1974); in involvement by weak control users have "sign off" responsibility for IS plan; in involvement by doing user is a planning team member; and in involvement by strong control users pay directly for new development in IS plan.

MEASURES FOR USER INVOLVEMENT

Measures can focus on specific activities or events to which the user can respond to strategic planning of IS relatively objectively (Olson and Ives, 1981). User involvement in strategic planning of IS could be explaining and clarifying information requirements for IS strategic plan, detailing input/output, stating IS objectives and asking questions and providing answers in IS planning process.

STRATEGIC SUCCESS OF IS

IS ENABLEMENT FOR ORGANIZATIONAL CHANGE

Thach and Woodman (1994) give three common methods for organizational changes to take place. Firstly, top management vests the responsibility to IS department as change agent; secondly, management is having a systems approach to change the organizational structure and processes; and thirdly, management sets a vision for the future and determines to achieve it. Information systems facilitate the organization for the change process by all the three methods. Developing flexible information technologies are converging to create an impetus for major changes in structure, function, and process of business organizations (Grover *et al*, 1993).

STRUCTURAL CHANGE

IT innovations changed the nature of work, forcing old organizational structures into new configurations. Bureaucratic hierarchy form used by most organizations became obsolete (Morgan, 1986; Nolan *et al*, 1988) and IT enabled “network” organization is suited for managing complexity and speed. Already organizations started having distributed processing platform in the network architecture (Applegate, 1993).

PROCESS CHANGE

Information Systems Technology (IST) is used to ‘informate’ employees rather than ‘automate’ the processes (Shoshana 1988). IST is informing the business by communicating mission, objectives and market philosophy, combined into a unifying focus world wide leading to common processes and systems. Most process innovations are enabled by IST (Davenport, 1993), and IST has been viewed as catalyst for change (Senn, 1992). IST has become embedded in the firm’s core business processes, contributing to the firm’s high performance (Yetton *et al*, 1994).

The analysis and design of work flows and processes within and between organizations are indicated by Davenport and Short (1990). For achieving business goals, radically overhauling the business by using IT as a central lever is suggested by Venkatraman (1991). The fundamental

analysis and radical redesign of business processes to achieve dramatic improvements is dealt by Hammer (1990).

In change processes, sometimes IS technology leads the change (technological imperative) and in some cases organizational objectives lead to IS design (organizational imperative) (Markus and Robey, 1988). IST not only initiates major changes but also support the subsequent changes (Grover *et al*, 1993) and lay foundation for new business processes (Goodhue *et al*, 1992).

IS ENABLEMENT FOR COMPETITIVE ADVANTAGE

The five competitive forces that determine the profitability and survival of an organization are bargaining power of customers, bargaining power of suppliers, threat of new entrants, threat of substitutes, and the rivalry of competitors within the industry (Porter, 1979). How information systems facilitate businesses to counter the threat of these competitive forces? IS should be used to build barriers against new entrants, to change the basis of competition, to generate new products, to build in switching costs, and to change the balance of power in supplier relationships (McFarlan, 1984). The studies in the past demonstrate that IS offer a unique opportunity for competitive advantage in the new business climate (Porter and Millar, 1985).

Information systems and technology (IST) can be used to implement a variety of competitive strategies such as lowering cost, product differentiation, quality improvement and so on. O'Brien (2001) explains how companies can use IS technology to implement competitive strategies. Parson (1983) discusses the strategic impact of IST at the industry, firm, and at the strategic level. At the industry level, IS changes the products and services, markets and production economics; at the firm level IS build barriers against the key competitive forces; and at the strategy level IS permits to lower the cost, differentiate the products, and concentrate on market niche (Ives and Learmonth, 1984). Jackson (1989) explains the way of combining IT and competitive advantage. According to him, either the industry structure changes in favour of the organization or steps have to be taken to reduce the effects of it moving against the organization.

Tavakolian (1989) indicates that IT structure is strongly related to competitive strategy. Benjamin *et al* (1984) argue that the gap between the opportunities created by IS and the effective utilization of information

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technology must be narrowed. Research indicates that IS is the dedicated competitive tool which can be used to collect business intelligence on markets, new technologies, customers, competitors and broad social trends.

IS ENABLEMENT FOR ORGANIZATIONAL LEARNING

Organizational learning is a process by which organizations learn collectively through interaction with their environment (Cyert and March, 1963). Increasing adaptiveness is the first stage in moving toward learning organization (Senge, 1990). Individuals learn by updating their beliefs about the response for a particular action and this cycle continues. The other members also feel a similar experience and the information has been shared creating organizational memory in the form of shared beliefs, assumptions and norms (Argyris and Schon, 1978). The whole organizational memory gains a momentum leading into organizational actions in the form of strategy implementation. As individuals gain new knowledge and insights to modify their behaviour and actions, organizations also gain new insights and modified behaviour (Levitt and March, 1988; Stata, 1989). So organizational learning is the development of new knowledge or insights that have the potential to influence the behaviour (Simon, 1969; Huber, 1991; Sinkula, 1994). Presumably learning facilitates behaviour change that leads to improved performance (Senge, 1990; Sinkula 1994).

The major components of organizational learning are information acquisition, distribution, interpretation and organizational memory (Sinkula, 1994) Since organizational learning activities are information driven (Galbraith, 1977; Goldstein and Zack, 1989), IS transforms data into information and then help managers to transform information into knowledge and knowledge into action (Stata, 1989). IS holds out the prospect of increasing the efficiency and scope of information processing within organizations and so eating the problem directly by increasing the speed and cohesion of response (Kanter, 1989). So organizational learning is facilitated by information dissemination and accomplishing a shared interpretation of the information.

RESEARCH HYPOTHESES

- H1. More the user involvement in strategic planning of Information Systems, greater the possibility of involvement in information requirements analysis and architecture.
- H2. More the user involvement in strategic planning of Information Systems, greater the possibility for IS enabled organizational change.
- H3. More the user involvement in strategic planning of Information Systems, greater the possibility for IS enabled competitive advantage.
- H4. More the user involvement in strategic planning of Information Systems, greater the possibility for IS enabled organizational learning.
- H5. More the user involvement in IRA & Architecture, greater the possibility for IS enabled organizational change.
- H6. More the user involvement in IRA & Architecture, greater the possibility for IS enabled competitive advantage.
- H7. More the user involvement in IRA & Architecture, greater the possibility for IS enabled organizational learning.

METHODOLOGY

The conceptualization of the research problem and selection of research techniques are given in this section. The study considers organic systems of user, information systems, and organization. User involvement interfaces with supra systems of IS and organization. The interaction of these systems are more complex and unpredictable. User is a member in the planning team, whose interaction with other members who have diverse conceptual framework may result into pluralistic and conflicting views. The planning covers a range of information systems from operational to strategic; uncertainties are more for strategic than the operational systems. IS strategic success, the expected outcome is uncertain because of the influence of factors other than user involvement. In other words, converse hypothesis can also be considered. The converse could be achieving IS success with no involvement from users (Land and Hirschheim, 1983). Moreover, the intelligibility of involving users, benefits of involvement, and type of involvement at different phases of planning process is also not clear.

Considering above issues in the problem conceptualization, an empirical study is proposed for primary data collection. Questionnaire

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method is selected for hypotheses testing. Impreciseness in the interplay can be represented by fuzzy sets and the pluralistic views of the planning team can be quantified by possibility values. More insights into the qualitative variables can be obtained by considering the dimensions of involvement and IS success. Field generated measures for IS strategic success variables are proposed.

MEASURES FOR USER INVOLVEMENT AND IS STRATEGIC SUCCESS VARIABLES

MEASURES FOR USER INVOLVEMENT IN IS PLANNING

Standard measures are available for user involvement. For user involvement in IS planning, field generated measures are used besides standard measures. Fourteen IS experts from industry and academia participated to generate measures and are given in Appendix I.

MEASURES FOR IS STRATEGIC SUCCESS VARIABLES

The measures for IS Strategic Success Variables were generated by idea engineering; twenty two senior managers from public and private sector organizations participated in this exercise. The responses were obtained with the following world view: User involvement leads to IS Success. The field generated measures are shown in Appendix I.

DIMENSIONS OF USER INVOLVEMENT

User involvement dimensions considered in the study are control, responsibility, advice, and symbolic. When users perceive certain application systems are critical for their job enrichment, they go to the extent of developing them out of their own budgets. Here the users show high level of commitment for IS planning; the deviations of IS plan from user expectations are controlled by users themselves.

IS planning committee could involve user representatives from functional areas; each user representative takes sign off responsibility at each step of the IS planning process. Though some of the information systems do not directly affect the job routine of each individual user, for

the benefit of the organization, user has to take responsibility in explaining information links between different functional areas.

User views on IS policies, guidelines, rules, procedures are solicited through questionnaires and interviews. Here users play advisory role in planning and developing the information systems. Some times interactive involvement may not be there, but one time inputs are obtained in the form of advice and views.

Symbolic involvement of users is shown if the users are not able to assess their information requirements. Lack of expertise from the users or unwillingness may disqualify them from IS planning process. In these situations, users are involved tangentially; and their inputs are requested for the planning process and at the same time irrelevant inputs may be ignored by IS planners.

DIMENSIONS OF IS SUCCESS

The dimensions of IS success were evolved in a workshop on information systems planning. A group of twenty participants in the workshop gave their feedback for dimensions of IS success. The participants were all senior level managers with more than ten years of information systems usage experience. The prioritized dimensions among the evolved ones are organizational enhancement, decision effectiveness, improved productivity, and cost reduction.

ORGANIZATIONAL ENHANCEMENT

The information systems and organizations influence one another. IS enable the organization to gain strategic advantage and to explore environmental opportunities. Information systems enable the organization to get strategic benefits like competitive advantage, implementation of organizational change and accomplishment of organizational learning. These strategic benefits lead to organizational enhancement.

DECISION EFFECTIVENESS

Information Systems enable the organization to prepare for the future by improving the capability of employees to understand, respond to, manage

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and create value from information. The employees apply different types of information systems to make effective decisions. Information systems provide information to assess and analyze alternatives for making effective decisions. Feedback on post implementation of decisions is instantaneously reported by a flexible information systems.

IMPROVED PRODUCTIVITY

Besides productivity improvement of information and knowledge workers, organizational productivity is increased by rethinking the business processes. Information systems enable the organizations for productivity improvement thereby yield high returns of information systems investment. Information Systems enable the organizations to store, analyze, retrieve data and present the information. IS reduces the time spent in information searching, and produces knowledge outputs like diagnosis, descriptions, instructions, schedules, plans, and decisions.

COST REDUCTION

Operational information systems like office automation systems reduce the cost in processing information. IS provides tangible and intangible cost benefits to the organization. Savings in labor costs, decreased investment in resources, decrease in organizational operating cost are the examples of tangible cost reduction; Information availability, increased ability to analyze organizational problems, improved customer service, improved competitive position, and improved business image are the examples for intangible cost reduction.

WEIGHTS FOR THE DIMENSIONS

The weights for the dimensions of user involvement and IS success were obtained from twenty respondents who participated in a workshop on "Information Systems Planning." The respondents were senior level IS executives from Industry.

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The weights for the dimensions of user involvement on a scale of 0-1 are as follows:

| | | |
|----------------------|---|------|
| Responsibility | - | 0.40 |
| Control | - | 0.25 |
| Advice | - | 0.25 |
| Symbolic Involvement | - | 0.10 |

The weights for the dimensions of flexibility on a scale of 0-1 are as follows:

| | | |
|----------------------------|---|------|
| Organizational Enhancement | - | 0.30 |
| Decision Effectiveness | - | 0.40 |
| Improved Productivity | - | 0.20 |
| Cost Reduction | - | 0.10 |

SCALE MATRIX

A scale matrix was prepared to facilitate the respondents to synthesize the responses on different dimensions. The quantitative conversions of qualitative judgements are given in advance to consider the answers on a standardized scale. The input for the scale matrix was obtained in the form of fuzzy sets from a group of nine IS executives from public and private sector organizations. The fuzzy sets corresponding to qualitative judgements for user involvement are given in Appendix IIa and for IS success are given in Appendix IIb.

PILOT TESTING

The questionnaire items and instructions to use the scale matrix were validated by thirty five IS practitioners from field and academia. As a result some items in the questionnaire were rephrased and complex words were removed; Instructions to use the scale matrix were simplified; duplicate and double-barreled questions were removed. The scale table construction including the dimensions of the research variables and fuzzy sets were validated.

VALIDATION SCHEME

The validation scheme has been given in three phases: structure, behavior, and policy implications. The structure validation is testing for the objective; behavior validation is for testing the behavior (results) generated by the survey, and policy implications are validating the recommendations made by the survey (Sushil, 1993).

STRUCTURE VALIDATION

Questionnaire Construction: The questionnaire items, the scale matrix and the dimensions of the research variables were validated by field experts. The participants were Directors and Deputy Directors of IS at the time of this study. The measures for IS strategic success variables were developed through idea engineering exercise in which twenty two senior level user managers from public and private sector organizations participated; field generated measures add more confidence to the construct validity of the questionnaire. The twenty items instrument was pilot tested with thirty five IS practitioners who had more than five years experience in IS usage.

Respondent's Relevance: The respondent's relevance for this study was ensured by a set of predefined criteria; the inputs of irrelevant respondents were ignored. By this data filtering process, higher confidence was assured on the data part.

BEHAVIOUR VALIDATION

To ensure more confidence in the data analysis and results, extreme cases of data values were omitted from analysis; for this 2.5% on either side of the data distribution was excluded from analysis. For univariate and bivariate analysis, optimistic, most likely, and pessimistic data values were considered to obtain different scenarios.

Hypotheses Testing: The hypotheses are validated by chi-square values with 0.0001 level of significance, this gives more confidence for validation. The degree of association between the pair of variables was obtained by Pearson's correlation coefficient with 1 tailed level of significance at 0.01 and 0.001

level. The extreme values of data viz. optimistic and pessimistic values were also used to confirm the hypotheses by chi-square and correlation values.

Policy Implications: Management intervention points and recommendations suggested by the study were validated with field experts. Different policies for involving users in strategic planning of IS were identified; the feasibility to implement these policies was cross-checked with experts through interviews.

DATA COLLECTION

SAMPLE DESIGN

The respondents for the survey were chosen from IS users and planners population. The respondents were selected at random with a purpose of obtaining their views on involvement and IS strategic success and hence the sample is random and purposive one. The sectors included in the survey are: service, information consultancy, engineering, automobile, consumer goods, consumer durable, high technology and government. From these sectors forty two public and private organizations were selected at random. To diminish the skewness on data collection from the same geographical region and to get views from widely scattered population, the survey was conducted in three major Indian cities: New Delhi, Chennai, and Bangalore. The twenty items questionnaire instrument was personally administered to 296 respondents from 42 organizations. The respondent's profile with number of respondents in each sector is given in Table 1.

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Table 1: Respondent's Profile

| Industry/Organization | No. of Respondents | Industry/Organization | No. of Respondents |
|---|--------------------|--|--------------------|
| SERVICE NCDC NCUI State Bank of India Indian Airlines ICICI Citicorp ABC Consultants (Pvt.) | 70 | CONSUMER GOODS ITC Liquid Engrs India (P) Mas Energy India (P) Saviourite Limited Adfast Plymers Wipro GE | 23 |
| INFORMATION CONSULTANCY NIC Ergo Software Ltd. TCS Ramco Systems Pentagon Inno. Sys. TISL Tata Unisys U.B. Inf. Consul. Microland Paradise Software (P) Tata IBM Soft Solutions (P) Ltd Dun & Bradley SS(P) Ltd | 86 | CONSUMER DURABLES J.K. Indus. Ltd. Network BPL Sanyo Modi Xerox Logicstat | 15 |
| ENGINEERING L & T API Engg Works (P) Ltd. Vickers India Ltd. | 35 | HIGH TECHNOLOGY ABB Power Grid IPCL CMC | 36 |
| AUTOMOBILE Maruti Udyog | 22 | GOVERNMENT Planning Commission Head Post Office, ND. Total : 42 Organization Respondents 296 | 9 |

RESPONDENT'S RELEVANCE

The survey includes views of user respondents from strategic, tactical, and operational levels of management. The managerial level of respondents and distribution of organizations based on annual sales turnover are given in Table 2. The respondent relevance to the study was ensured by following criteria: functional expertise of the user, managerial level of the user and number of years of experience in IS usage.

Table 2: Managerial Level of Respondents and Distribution of Organizations

| Respondents by Position | No. of Respondents | Distribution of Organizations | No. of Respondents |
|-------------------------|--------------------|---------------------------------|--------------------|
| Managerial Level | | Annual Turnover (Rs. in Crores) | |
| Strategic | 38 | Less than 100 Crores | 115 |
| Tactical | 153 | 101-200 | 39 |
| Operational | 85 | 201-300 | 7 |
| | | 301-400 | 18 |
| | | 501-1000 | 14 |
| | | 1000-2000 | 6 |
| | | 2001-3000 | 10 |
| | | 3001-4000 | 21 |
| | | 4001-5000 | 32 |
| | | 5000-7000 | 14 |

Functional expertise of the user: When a user is specializing in the same function for number of years, explaining the functional strategies and linking them with IS plan will be much easier; Detailing inputs for IS plan for functional information systems will be much better.

Managerial Level of User: The IS planning horizon and IS usage flexibility are more for strategic level users than operational level user. Tactical level people focus more on management control applications. Inclusion of users from these three levels will be more appropriate for the study.

Experience in IS Usage: IS usage experience enables the users to have more exposure to IS planning activities. IS planning activities will be much clear for experienced users than novice users.

RELEVANCE SCORE FOR THE SAMPLE

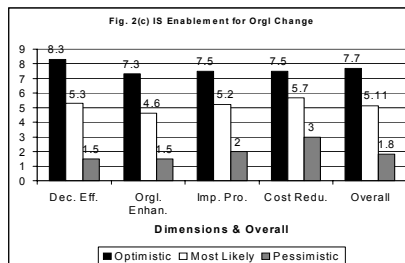
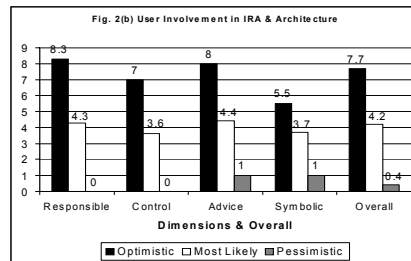
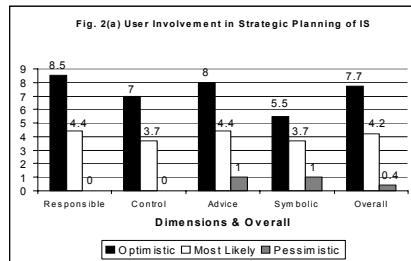
The relevance score for each respondent was computed based on the criteria; the individual score for relevance ranges from 0.4 to 1. The most likely aggregated score for the sample is 0.76 indicating a fairly high relevance. Optimistic and pessimistic scores are 0.95 and 0.45 respectively, and 95% of the total respondents' relevance score falls between this range.

STATE-OF-THE-ART ANALYSIS: UNIVARIATE ANALYSIS

The optimistic, most likely, and pessimistic values for each item in the questionnaire are shown in Appendix III.

Dimension-wise Values for User Involvement and IS Strategic Success Variables

Optimistic, most likely and pessimistic values for responsibility, control, advice and symbolic dimensions of user involvement in strategic planning of IS are shown in Figure 2(a); for user involvement in IRA & Architecture are shown in Figure 2(b). Optimistic, most likely and pessimistic values for organizational enhancement, decision effectiveness, improved productivity, and cost reduction dimensions of IS strategic success are shown in Figures 2(c), 2(d), and 2(e) respectively.



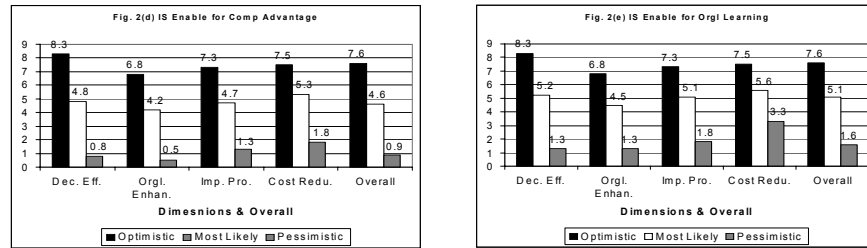


Figure 2: Dimension-wise Values for User Involvement and IS Strategic Success Variables

OVERALL VALUES FOR THE VARIABLES

Overall values are obtained by aggregating the dimension-wise values; for aggregation the weights of respective dimensions are used. The overall value for each variable in optimistic, most likely and pessimistic scenarios are reported in Table 3. The overall values give the state-of-the-art situation of each variable.

Table 3: Overall Values for the Variables

| No. | Variable Name | O | M | P | S.D. |
|-----|--|------|------|------|------|
| 1. | User Involvement in Strategic Planning of IS | 7.7 | 4.15 | 0.35 | 2.06 |
| 2. | User Involvement in IRA and Architecture | 7.62 | 4.11 | 0.35 | 1.99 |
| 3. | IS Enablement for Organizational Change | 7.76 | 5.11 | 1.75 | 1.6 |
| 4. | IS Enablement for Competitive Advantage | 7.57 | 4.46 | 0.91 | 1.93 |
| 5. | IS Enablement for Organizational Learning | 7.57 | 5.0 | 1.6 | 1.74 |

O - Optimistic Values, M - Most Likely Values, P - Pessimistic Values, SD - Standard Deviation

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Hypotheses Testing for User Involvement and IS Success Variables

The results of hypotheses testing between user involvement and IS strategic variables are summarized in Appendix IV a, IV b, and IV c. Chi-square, a non-parametric statistic is used to test the relatedness of two variables in a hypothesis. Pearson's correlation coefficient was computed to find the degree of association between the related pair of variables in each hypothesis. Since the research data was in interval scale, to measure the degree of proportion between two variables, correlation coefficient is found to be more appropriate statistic. SPSS package was used to compute the statistical values.

User Involvement in Strategic Planning of IS and User Involvement in IRA and Architecture

The results in Appendix IV a show a significant Chi-square value for user involvement in IS strategic planning and User Involvement in IRA and Architecture. The results validate that the two are related in optimistic, most likely, and pessimistic data values; the degree of association between the two is positive ($r=.7875$) at 0.001 level of significance. This shows a very high degree of association between the two variables.

User Involvement in Strategic Planning of IS and IS Enablement for Organizational Change

The Chi-square value in Appendix IV b shows that user involvement in strategic planning of IS and IS enablement for organizational change are not independent and validate that the two are related on most likely, and pessimistic data values; showing a positive association ($r=.2079$) at 0.001 level of significance.

User Involvement in Strategic Planning of IS and IS Enablement for Competitive Advantage

Appendix IV b shows a significant Chi-square value between user involvement in IS strategic planning and IS enablement for competitive advantage and validate that the two are not independent on the optimistic

and most likely data values; the association between the two is positive ($r = .2081$) at 0.001 level of significance.

User Involvement in Strategic Planning of IS and IS Enablement for Organizational Learning

Chi-square value in Appendix IV b shows that user Involvement in strategic planning of IS and IS enablement for organizational learning are not independent and validate that the two are related on optimistic, most likely, and pessimistic data values; showing a positive association ($r = .3911$) at 0.001 level of significance.

User Involvement in IRA and Architecture and IS Enablement for Organizational Change

Appendix IV c shows a significant Chi-square value for user involvement in IRA and architecture and IS enablement for organizational change and validate that the two are not independent on optimistic, most likely and pessimistic data values; the association between the two is positive ($r = .2491$) at 0.001 level of significance.

User Involvement in IRA and Architecture and IS Enablement for Competitive Advantage

Chi-square value in Appendix IV c shows that user involvement in IRA and architecture and IS enablement for competitive advantage are not related on optimistic, most likely, and pessimistic data values. So hypothesis H6 is rejected.

User Involvement in IRA and Architecture and IS Enablement for Organizational Learning

Chi-square value in Appendix IV c shows that user involvement in IRA and architecture and IS enablement for organizational learning are not independent and validate that the two are related on optimistic, most likely, and pessimistic data values; showing a positive association ($r = .3482$) at 0.001 level of significance.

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Chi square and correlation values shown in Appendix IV supports the following hypotheses at 0.001 level of significance:

- H1. More the user involvement in strategic planning of Information Systems, greater the possibility of involvement in information requirements analysis and architecture.
- H2. More the user involvement in strategic planning of Information Systems, greater the possibility for IS enabled organizational change.
- H3. More the user involvement in strategic planning of Information Systems, greater the possibility for IS enabled competitive advantage.
- H4. More the user involvement in strategic planning of Information Systems, greater the possibility for IS enabled organizational learning.
- H5. More the user involvement in IRA & Architecture, greater the possibility for IS enabled organizational change.
- H7. More the user involvement in IRA & Architecture, greater the possibility for IS enabled organizational learning.

Chi square and correlation values shown in Appendix IV c refutes the following hypotheses at 0.001 level of significance:

- H6. More the user involvement in IRA & Architecture, greater the possibility for IS enabled competitive advantage.

DISCUSSION

There are no quick and easy answers for why information technology development projects succeed or fail. However the cases of successful organizations reveal that meaningful involvement of users is the key ingredient for high level performance of IS. Top reasons for information systems success are user involvement, clear statement of requirements and proper planning; and top reasons for information systems failures are lack of user input, incomplete requirements and specifications, changing the requirements and specifications.

It is not the IS technology that creates a competitive edge, but the process of applying and utilizing IST gives the edge. The people side of IS is often complex and difficult to manage than the technology side of IS. The role of human element is critical in achieving strategic success of IST.

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Involving user managers in the governance of IS plan and implementation will improve the business value of IST. Developing governance structures such as executive councils and steering committees encourage users for active participation to increase the business value of IST. Collaborative plan of users, planners, analysts, top management and planning experts is essential component for IS strategic success.

User satisfaction level in existing IS, system usage are some of the factors affecting the degree of involvement in IS planning. User attitude towards IS drives the interest on subsequent usage and planning of IS. How do the users show their involvement? Users are involved in IS planning activities and play multi-role such as advising, suggesting, explaining, controlling, doing, taking responsibility and so on. Users can take the responsibility of IS planning; users can control the planning activities, can play the advisory role and can have authority to sign-off the completion of every planning activity.

The major changes in business processes include implementation of e-commerce systems and technologies; organizations have different strategies to manage business change, user involvement in applying IST to manage business change is a basic requirement. New designs of business processes generate some resistance by the users affected. User resistance to share the knowledge is the biggest obstacle to the implementation of IS plan. One of the keys to solving problems is involving users in organizational change process and obtaining their advice on the ways of changing the business processes.

Though, in general all the users are equal stockholders in IS planning, due to their other routine commitments the user representatives from the key departments are to be selected and involved. Direct user involvement in IS planning especially important in reducing the potential for user resistance. That is why users are to be members of IS planning committees or do their own development of IS plan. Such involvement helps ensure that users assume ownership of IS plan, and that its implementation meets their information requirements. Systems that find to inconvenience or frustrate users can be avoided in the IS plan, no matter how technically elegant they are. As users and business processes are a major focus of organizational change management, IS planning activities such as change strategies and direction for IS development are to be suggested by users concerned.

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Users can explain impending changes in the environment so that strategic flexibility in IS can be incorporated. Users specify where the change should take place, what business information needs for each business process, and what type of IS support to initiate major changes in the business processes.

When critical success information are advised by the users, the opportunities created by IS for improving the business will improve. When the users are able to suggest the information requirements more accurately, the multiplicity of inputs and outputs can be reduced considerably. If the data model has been constructed by stating the information links between the business units, the frequency of information exchange between the two functions are taken care of.

Users specify the ways of building barriers to new entries and the business strategies to retain the customers. Users explain the competitive strategies such as lowering costs, product differentiation, product innovation so that IS plan can address the issues related to implementation of the strategies. Users can advise how to reduce the cost of business processes and new ways of IS support to differentiate products and services.

Users state the relationships between the variables in the systemic model, explains how and where IS can support to understand the impact of delays in the organizational processes. User takes the responsibility to determine the information processing capability for each system activity such as user interface requirements, processing requirements, storage requirements and control requirements.

CONCLUDING REMARKS

The data analysis results show that user involvement in one stage of IS planning influences the level of participation in the subsequent stage. Users who shared the business mission and strategies can explain the critical success factors to achieve the mission. When users are involved in the process of linking the IS plan with business strategies, constructing a corporate data model will be easy for them, and can clearly state information links between the business units. So user involvement in strategic planning of IS will generate more chances to involve themselves in information requirements analysis and architecture. Users play a multi role such as explaining, suggesting, specifying, controlling, and taking responsibility

of doing IS planning activities. Including user representatives in IS planning committee is the starting point for a successful IS plan. If the user perceives the information systems to be highly useful for the job performance then attitude toward IS plan will be more positive and more inclined for IS planning activities.

Top management, planner and user collaboration is suggested for an implementable plan. As the planning team works, the actors collaborate with each other by exercising their freedom of choice by acting and reacting to the common goals of IS plan. Users can better assess the changes in functional systems, impact of environmental changes on organization. For linking the IS plan with business plan, users, planners and top management play a crucial role. Users and planners can analyze together the impact of IST on organization.

As organizational learning reinforces the positive outcomes of strategic moves and rejecting the negative outcomes of strategy implementation, IS planning must indicate the avenues for organizational learning. User involvement in strategic planning of IS facilitating the users to learn about the strategic activities of the organization. As IS planning focus on integrative, innovative, intelligent and interactive applications, management should train the users for the process of transforming the business mission into IS planning focus and objectives. Planning tools like workshops, brainstorming, in depth interviews, Nominal Group techniques, Idea engineering can be applied. Users can take the responsibility in implementing the planning decisions. Other facilitators for IS strategic success which may need further research are IS technology, IS maturity in various functional areas, IS context variables such as organizational culture and organizational structure.

APPENDIX I. MEASURES FOR USER INVOLVEMENT AND IS STRATEGIC SUCCESS VARIABLES

USER INVOLVEMENT IN STRATEGIC PLANNING OF IS

User involvement level in explaining the business mission and the business strategies.

User involvement level in detailing the strategies or direction for information system development.

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User involvement level in analyzing the IT trends and their effect on the organization.

User involvement level in linking the IS plan with business strategies.

USER INVOLVEMENT IN IRA AND ARCHITECTURE

User involvement in stating the required information to achieve success in the business activity.

User involvement in determining information requirements for the organizational subsystems.

User involvement in constructing a data model at the corporate level.

User involvement in stating information links between the business units at the corporate level.

IS ENABLEMENT FOR ORGANIZATIONAL CHANGE

Information support to reduce the multiplicity of inputs and outputs in the business processes.

Degree of collaboration by exchanging information between the functions.

Information support to initiate and support major changes in the business processes.

IS created opportunities for radically improving the business processes.

IS ENABLEMENT FOR COMPETITIVE ADVANTAGE

IS capability for customer service so building barriers to new entries

IS competence to attract and interact with customers so to retain them

IS support to change the basis of competition such as cost based, product differentiation, and market niche

IS support to faster delivery with cheaper cost

IS ENABLEMENT FOR ORGANIZATIONAL LEARNING

IS indication level for the impending changes in the environment

IS support to prepare a new set of inputs/outputs to face the change process

IS provided systemic models for organizational functioning to identify the influential points of change

IS support to understand the impact of delays in the organizational processes

APPENDIX II**(a) Fuzzy Sets for Scaling User Involvement**

| Qualitative Values | Responsibility | Control | Advice | Symbolic |
|--------------------|----------------|---------|--------|----------|
| Very High | .9 | .8 | .9 | .2 |
| High | .8 | .6 | .7 | .3 |
| Moderate | .5 | .5 | .6 | .6 |
| Low | .2 | .3 | .3 | .5 |
| Very Low | 0 | .1 | .2 | .6 |
| Almost Nil | 0 | 0 | .1 | .1 |

(b) Fuzzy Sets for Scaling IS Success

| Qualitative Values | Decision Effectiveness | Organizational Enhancement | Improved Productivity | Cost Reduction |
|--------------------|------------------------|----------------------------|-----------------------|----------------|
| Very High | .9 | .9 | .8 | .9 |
| High | .8 | .6 | .7 | .6 |
| Moderate | .5 | .5 | .6 | .6 |
| Low | .3 | .3 | .2 | .5 |
| Very Low | .1 | .1 | .2 | .4 |
| Amost Nil | 0 | 0 | .1 | .1 |

APPENDIX III: Item wise Analysis (Question wise analysis)

| ITEM NAME (Qn. No.) | Optimistic | Most | Pessimistic | S.D. |
|---|------------|------|-------------|------|
| Q1. User explaining the mission and strategies | 8.45 | 4.03 | 0.35 | 2.51 |
| Q2. User setting the IS direction | 8.45 | 4.42 | 0 | 2.34 |
| Q3. Analyzing the IT trend | 8.45 | 4.14 | 0.35 | 2.44 |
| Q4. Clarifying the IT linkage with business | 4.45 | 4.06 | 0.35 | 2.41 |
| Q5. User explaining information needs | 8.45 | 4.5 | 0.35 | 2.37 |
| Q6. User explaining input/output information for subsystems | 8.45 | 4.64 | 0.35 | 2.34 |

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| ITEM | NAME (Qn. No.) | Optimistic | Most | Pessimistic | S.D. |
|------|--|------------|------|-------------|------|
| Q7. | Constructing corporate data model | 8.45 | 3.71 | 0.00 | 2.43 |
| Q8. | User explaining information links between the units | 8.45 | 3.74 | 0.35 | 2.42 |
| Q9. | Reducing the multiplicity of inputs and outputs in business processes | 8.50 | 5.03 | 1.50 | 2.30 |
| Q10. | Frequent information exchange between the functions | 8.50 | 5.28 | 1.50 | 2.29 |
| Q11. | Initiating and supporting changes in the business processes | 8.50 | 5.04 | 1.50 | 2.19 |
| Q12. | Creation of opportunities to improve the business processes | 8.50 | 5.22 | 0.30 | 2.39 |
| Q13. | Capability to build barriers to new entries | 8.50 | 4.64 | 0.30 | 2.55 |
| Q14. | Competence to attract and interact with customers | 8.50 | 4.44 | 0.30 | 2.56 |
| Q15. | Support to change the basis of competition | 8.50 | 4.85 | 0.30 | 2.61 |
| Q16. | Support to faster delivery with cheaper cost | 8.50 | 5.35 | 0.30 | 2.33 |
| Q17. | Indication of forth coming changes | 8.50 | 4.82 | 0.30 | 2.36 |
| Q18. | Support to prepare a new set of inputs/outputs to face the change | 8.50 | 5.09 | 1.50 | 2.23 |
| Q19. | Yielding systemic models to identify the influential points | 8.50 | 4.98 | 1.50 | 2.39 |
| Q20. | Support to understand the impact of delays in the organizational processes | 8.50 | 5.55 | 0.30 | 2.30 |

APPENDIX IV a: Results of Hypotheses Testing - User Involvement Variables

| Hypotheses | Variable 1 | Variable 2 | Results |
|------------|---|--|--|
| H1 | User Involvement in IS Strategic Planning | User Involvement in IRA & Architecture | 301.49 ^a 25 th .0000 ^c .7875 ^{**} R ^o , R ^M , R ^P |

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APPENDIX IV b: Results of Hypotheses Testing – User Involvement IS Strategic Planning and IS Success

| Hypotheses | Variable | User Involvement IS Strategic Planning (Most Likely) | Association (Optimistic, Most Likely, Pessimistic) |
|------------|---|--|--|
| H2 | IS Enablement for Organisational Change | 38.53 ^a | I ^o |
| | | 25 ^b | R ^M |
| | | .0004 ^c .2079** | R ^p |
| H3 | IS Enablement for Competitive Advantage | 42.31 ^a | R ^o |
| | | 25 ^b | R ^M |
| | | .0001 ^c .2081** | R ^p |
| H4 | IS Enablement for Organizational Learning | 76.38 ^a | R ^o |
| | | 25 ^b | R ^M |
| | | .0000 ^c .3911** | R ^p |

APPENDIX IV c: Results of Hypotheses Testing – User Involvement in IRA & Architecture and IS Success

| Hypotheses | Variable | User Involvement in IRA & Architecture (Most Likely) | Association (Optimistic, Most Likely, Pessimistic) |
|------------|---|--|--|
| H5 | IS Enablement for Organizational Change | 43.05 ^a | R ^o |
| | | 25 ^b | R ^M |
| | | .0003 ^c .2491** | R ^p |
| H6 | IS Enablement for Competitive Advantage | 32.43 ^a | I ^o |
| | | 25 ^b | I ^M |
| | | .1460 ^c .1386** | I ^p |
| H7 | IS Enablement for Organizational Learning | 53.55 ^a | R ^o |
| | | 25 ^b | R ^M |
| | | .0008 ^c .3482** | R ^p |

^a Pearson's Chi-square Value, ^b Degrees of Freedom, ^c Significance level

* Pearson's Correlation coefficient 1 tailed significance (p<.01)

** Pearson's Correlation coefficient 1 tailed significance (p<.001)

^o - Optimistic, ^M - Most Likely, ^p - Pessimistic

R - Related I - Independent

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Dr. Ramaraj Palanisamy is an Assistant Professor, Department of Information Systems, St. Francis Xavier University, P.O. Box: 168, Antigonish, Nova Scotia CANADA B2G 2W5. Telephone: (902)-867-2184, Fax: (902)-867-2448, Email: rpalanis@stfx.ca, Web site: <http://www.stfx.ca/people/rpalanis>

Dr. Sushil is a Professor of Strategic, Flexible Systems and Technology Management, Department of Management Studies; Indian Institute of Technology, New Delhi-110 016 India; Tel : 91-11-659 1167; Fax: 91-11-686 2620

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