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DETERMINANTS OF SUCCESS OF STRATEGIC INFORMATION SYSTEMS PLANNING (SISP): A REVIEW

This paper focuses on comprehensive analysis of determinants of SISP success. Current operationalizations of those determinants will be explored. Based on this analysis, methodologies employed to measure those determinants will be evaluated. Recommendations regarding the theoretical and empirical work that will be necessary to enrich the framework will then be provided.

Strategic information systems planning (SISP) has been recognized as a key issue by senior IS executives and academic researchers during the last two decades (Niederman et al., 1991). This continuing importance of SISP is largely because of its ability to contribute substantially to organizations. It is widely accepted that SISP can identify the most desirable information systems (IS) applications (McFarlan, 1971), align information technology (IT) with business needs (Lederer and Sethi, 1996), and help an organization carry out its existing business strategy. SISP can also help shape new business strategy (Earl, 1993). Moreover, increasing dependence of organizations on information technology intensifies the need to achieve the success of strategic information systems planning (Premkumar and King, 1994). Failure to execute SISP will result in lost opportunities, incoherent systems, and wasted resources (Fitzgerald, 1993). In fact, today's fierce and turbulent competitive environment aggravates the dangers of unsuccessful SISP activities. Exploration of effective ways to achieve SISP success has become a critical issue in SISP research (Earl, 1993).

SISP success is difficult to accomplish due to many contingent factors influencing the planning process (McFalan, and McKeney, 1983; Teo and King, 1997). Identifying determinants of SISP success is the first step. Despite the fact that there has been a number of studies on determinants of information planning success (Pyburn, 1983; Goodhue et al., 1992; Lederer and Sethi, 1988, 1991; Teo and King, 1997), most of them focus on a subset of some specific factors. For example, the impacts of top management involvement and participation on SISP success are identified and studied by many researchers (King, 1988; Jarvenpaa and Ives, 1991; Raghunathan, 1992). In contrast, very little significant research is conducted to analyze comprehensive success determinants.

On the basis of previous research, this paper focuses on comprehensive analysis of determinants of SISP success. To achieve this aim, this paper will provide a conceptual framework of SISP success. After clarifying the current views of SISP and definitions of SISP success, this paper will concentrate on a review of the prior research on determinants of SISP success based on the framework provided. Current operationalizations of those determinants will be explored and based on the analysis, methodologies employed to measure those determinants will be evaluated. Recommendations regarding the theoretical and empirical work that will be necessary to enrich the framework will then be provided.

Alternative Views of SISP

As a process that deals with the future potential effects of current decisions (Drucker, 1970), SISP is a mechanism for linking and integrating business strategies with IS strategies (Bradley et al., 1993; Premkumar and King, 1994; Pyburn, 1983). Due to the different understanding of relationship between strategic information systems planning and business planning (BP), there exist two distinct theoretical views of SISP in the strategic IS literature: "alignment" and "impact" (Vital et al., 1986).

From the "alignment" view, SISP is "the process of identifying a portfolio of computer-based applications that will assist an organization in executing its business plans and consequently realizing its business goals" (Lederer and Sethi, 1988). This view emanated from King (1978)'s suggestion that information systems planning (ISP) can be employed to link IS strategies with business strategies. This view assumes that IS are reactive in nature (Ng, 1984), follows pre-defined procedures and requires detailed analysis of process and data (Galliers, 1994).

The "impact" view emphasizes that IT can shape or impact business strategies (Parsons, 1983; McFarlan, 1984). Thus, SISP is defined as a business analysis process looking for technology applications with the ability to help the organization optimize its competitive advantage over competitors (Chan et al., 1997; Lederer and Sethi, 1988). Therefore, in contrast to the "alignment" view, which separates the SISP process from BP process, "impact" perspective underscores that SISP should be integrated within BP process (Goldsmith 1991). From this view, IT serves a proactive role in the business planning.

Recent studies discovered that elements of each of "impact" and "alignment" views are likely to be more or less required in different circumstances (Galliers, 1994). The nature of SISP is believed to be more complex that formerly believed. From this contingent perspective, not only does SISP consider portfolio of IS applications, but it also considers managerial values, experiences, organizational and infrastructure issues (Galliers, 1994; Segars et al., 1998a). Segars et al. claimed that SISP is distinguished from other forms of IS planning in terms of its broader scope, involvement of the highest levels of management, longer time frame and high levels of abstraction (Segars et al., 1998a).

This paper accepts this contingent view because many studies have confirmed the managerial, organizational and environmental influences on SISP activities in addition to the impacts of the planning approaches. Besides, SISP affects those managerial, organizational and environmental factors as well. The above three views are summarized in the table 1.

Table 1: Summary of Three Views of SISP

	Relationship of BP and SISP	IT role in planning	Planners composition	Focus
Alignment view	ISP is based on BP	Reactive to BP Supports BP	IS planners IS planners(possibly with BP planners)	Portfolio IT applications
Impact view	BP= SISP(integrated planning)	More proactive to BP	IS planners and BP planners	Portfolio IT applications
contingent view	BP⇔ SISP(interact, and/or integrate with each other)	Reactive and/or Proactive to BP	Highest level of management	Management, organization, infrastructure issues in addition to portfolio IT Applications

Strategic Information Systems Planning Success

Before proceeding to analyze determinants of SISP success, it is necessary to understand what strategic information systems planning success is. While early works measure SISP success as a uni-dimensional construct (Lederer and Sethi, 1991; Pyburn, 1983), it is now evident that SISP is such an intricate and complex activity involving various goals and multi-systems stakeholders that a multi-dimensional definition is regarded as a more precise conceptualization of SISP success (King, 1988; Segars, et al., 1998b).

There are several multi-dimensional definitions of SISP success (Fitzgerald, 1993; Segars et al, 1998b), varying with the approach adopted to assess the success. Dominant definition of SISP success is now conceptualized by combining two distinct but inter-related constructs, that is, planning system capabilities and the fulfillment of key planning objectives (Venkatraman and Ramanujam, 1987). The former, evaluating current planning systems in terms of the degree of improvement over a period of time (Venkatraman and Ramanujam, 1987; King, 1988; Dyson and Foster, 1980; Raghunathan and Raghunathan, 1994), measures the quality of planning process or "the means". The latter measures the degree of fulfillment of the objectives of SISP or 'ends' (Venkatraman and Ramanujam, 1987). This definition developed by Venkatraman and Ramanujam (1987) is deemed as sufficiently rigorous by many studies (Raghunathan and Raghunathan, 1994; Segars and Varun, 1998b). This paper accepts Venkatraman and Ramanujam's definition.

Theoretical Framework for Determinants of SISP Success

A conceptual framework for determinants of SISP success (Figure 1), based on the IS planning model of King (1988), consists of four components-- input, process, output, and outcome. The inputs to the strategic IS planning systems are information from business plans and resources for the planning process. Business planning as input provides business missions, objectives, strategies, and guidelines for IS planning. Process is the core component, during which information inputs are converted into plans that provide strategic directions for the IS function. It is a process of analyzing opportunities and threats for organization, coordinating organizational efforts into planning, and assessing IT's impacts on organizational development. The output of SISP highlights a set of choices that have been made during the planning process, including IS missions, objectives, strategies, goals, resources allocations, and information architectures. SISP success reflects outcomes of IS planning – the quality of planning process and the degree of fulfillment of SISP objectives. The direct link between SISP process and success indicates that a suitable planning approach, the effective use of organizational resources, and precise analysis of business environment and IT role are critical to SISP success. Contextual variables affecting whole IS planning system include environmental variables and organizational variables, each of which plays the role of either a facilitator or an inhibitor of SISP efforts. The framework suggests that determinants relating to these four domains could affect SISP success.
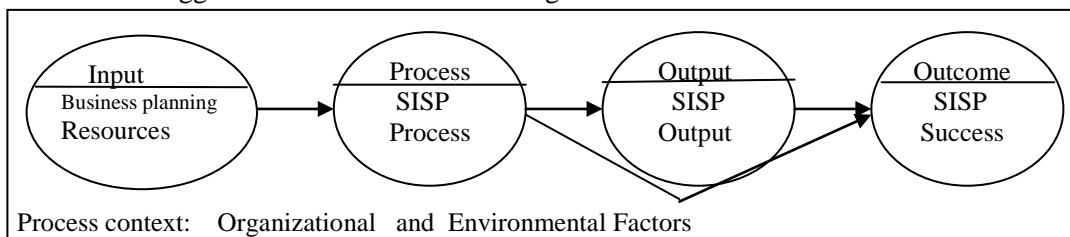

Figure 1. Conceptual Framework for Determinants of SISP Success

Based on the conceptual framework, this paper now analyzes determinants of SISP that have been empirically studied in the previous SISP research. The author believes that applying SISP literature to the SISP research model can provide a better understanding of current SISP research and help identify opportunities for future studies.

Analyzing SISP success determinants started with a search for relevant SISP publications. The search mainly focused on journals rather than other forms of publications because conceptual and empirical SISP research is more likely to be found in journals. As such, the author searched established IS journals where SISP related research has been consistently published (i.e. MIS Quarterly, Information Systems Research, Journal of Management Information Systems, and Information and Management). Some other journals whose main focuses are on SISP research (i.e. Decision Sciences, Management Science, Journal of Strategic Information Systems, Omega, and Long Range Planning) were also examined. Research methodology employed in each empirical paper was carefully analyzed. Determinants of SISP success identified are presented as follows.

Business Planning Factors

It is believed that the absence of formal business planning makes SISP success more difficult to achieve (McLean and Soden, 1977). Earl (1993) demonstrated that the availability of business strategy is among the top three success factors, ranking just behind top management involvement. Factors relating to business planning that have been explored are (a) the linkage between business planning and IS planning, (b) the sophistication of business planning, and (c) the quality of business planning.

Although the linkage between business planning and IS planning has been advocated for nearly two decades (Lederer and Mendelow, 1986; McLean and Soden, 1977; Premkumar and King, 1991, 1994; Raghunathan and Raghunathan, 1994), operationalization of this construct has not been paid much attention. Linkage is defined as the degree to which IT missions, objectives, and plans are supported by business missions, objectives, and plan. Reich and Benbasat (1996) differentiated social dimension and intellectual dimension of linkage, and developed measurements for the former. While some researchers have done some preliminary studies on the intellectual dimension of linkage (Chan et al., 1997; Zviran, 1990), research interests developing an instrument for capturing a complete picture of the linkage have just begun.

Sophistication of business planning describes the degree of structure employed in the business planning process. The level of sophistication of business planning is positively related to the quality of SISP (Lederer and Mendelow, 1986). By categorizing sophistication at financial, tactical, and strategy level, Lederer and Sethi (1988) discovered that the extent of problems faced by SISP planners is inversely related to sophistication of strategic business planning. However, they did not directly measure effects of the level of sophistication on SISP success.

It is proposed that the quality of strategic business planning significantly influences IS planning process (Lederer and Mendelow, 1986; McLean and Soden, 1977). In their survey of 245, however, Premkumar and King (1994) found that quality of strategic business planning only explains 5.77% of the variance in SISP success. They speculated that the sophistication of business planning and linkage between business and IS planning could be a better predictor of SISP. They requested further study on this issue.

SISP Process

SISP process differs with the planing approach adopted. Few researchers study the correlation between the planning approaches and success due to difficulties in conceptualizing and operationalizing different planning approaches. Despite the scarcity of studies on this issue, conflicting findings exist on whether planning approaches have effects on the success of SISP. Some discovered that differences among planning approaches do not have significant influences on the problems that emerged during SISP process (Lederer and Sethi, 1988; Flynn and Goleniewska, 1993), while some other researchers reported just the opposite findings (Earl, 1993). These studies, very descriptive in categorizing planning approaches, are usually small-sample-size research.

Going beyond these descriptive studies, recent research has identified planning process variables to describe characteristics of SISP approaches (Das et al., 1991; Segars et al., 1998a). Based on research of Das et al., Segars et al. operationized six planning process variables (i.e. formality, scope, participation, flow, focus, and consistency) and examined their effects on planning effectiveness—organizational contributions of SISP. Their findings are very useful for future studies on investigating effects of planning approaches on SISP success.

Another factor describing planing process is planning horizon. Planning horizon refers to the planning period covered by SISP study (Lederer and Sethi, 1988). McFarlan (1971) highlighted the importance of identifying a proper planning time horizon, and suggested that IS planning horizon matches better with the business planning horizon in firms with successful IS planning. Lederer and Sethi (1988) discovered that the specified planning horizon associates with fewer problems compared with non-specified planning horizon. Premkumar and King (1991, 1994) demonstrated that longer time horizon helps planning success. However, their studies implied that benefits of time horizon do not extend beyond four years.

Organizational Determinants

Top management involvement and participation. The relationship of top management involvement and participation to success of SISP has been well established and empirically confirmed. SISP most likely succeed with top management involvement and participation and fail without them (Earl, 1993). Top management involvement and participation lead to progressive strategic uses of information technology (Javenpaa and Ives, 1991), active users' involvement in SISP process (Lederer and Sethi, 1988). They also lead to sufficient resources allocated to SISP (Lederer and Mendelow, 1986; King, 1988). Top management participation and involvement also lead to sufficient control over the planning process, and facilitate the resolution of conflicts among organizational units (Goodhue et al., 1992). Further, CEO's participation has been found to have greater impacts on performance than other top-level management (Raghunathan, 1992).

It should be noted that participation and involvement are two related but distinctive constructs. Involvement is a subjective psychological state while participation, on the other hand, refers to the behaviors and activities performed (Barki and Hartwick, 1989). However, SISP studies do not clearly differentiate participation and involvement. Neither have effects of the two constructs been examined separately on SISP success.

Role of IT. Role of IT describes the status of IT department within an organization and its impact on present and future business operations. The paper reveals two factors relating to the role of IT: (1) the informal and formal relationship of IS to top business management, (2) the level of IT applications.

Formal and informal relationships of IS executives to top business management have impacts on SISP success. Although it is confirmed that the informal relationship influences SISP success (Lederer and Mendelow, 1987), Pyburn (1983) emphasized that only informal relationship does not help top managers obtain a clear understanding of IS planning. Some exploratory studies examined the impact of formal relationships such as the inclusion of CIO as part of senior management team (Lederer and Sethi, 1988), and reporting relationship of IS executive to top management (Lederer and Mendelow, 1987). Pyburn demonstrated that participation of IS department in business planning facilitates top managers to guide SISP process, and ensure its fulfillment of organizational goals. McFarlan (1971) suggested that a firm in which a top IS executive reports to a higher-level business executive places more emphasis on planning, uses IS resources more effectively, and has greater planning ability. Lederer and Sethi (1988) confirmed that firms would have fewer problems where IS executive reports to a (vice) president rather than a controller.

It is also found that the level of IT applications has influences on IS planning success (Raghunathan and Rgahunathan, 1990; Premkumar and King, 1991). By differentiating current impacts of IT applications on an organization development from future IT impacts, Premkumar and King (1994) found that organizations that plan to use IT applications for future strategic use have a higher possibility to achieve SISP success. They operationalize current role of IS as IT capabilities of supporting day-to-day operations in firms, and the future role of IT as IT's ability to reflect strategic objectives.

Size. It has long been assumed that increases in size result in more planning activities. (MaFarlan et al.,1983; Pyburn, 1983). The larger a corporation, the more complex contents and activities of SISP would be. It has been confirmed by case studies of Goodhue et al. (1992). They found that in large corporations, planners easily get lost in the 'crush' of details. In addition, uneven planning quality causes difficulty in consolidating separate planning activities into a coherent one. In contrast to the findings of conceptual and case studies, however, strong correlation between size and success of SISP has not yet been established in survey studies (Premkumar and King, 1994). Some researchers suggested that this weak relationship is due to a discontinuity in the relationship (Gremillion, 1984).

Organization ownership. McLean and Soden (1977) had expected but failed to find a relationship in the SISP characteristics of publicly and privately held companies. Neither did Lederer and Sethi (1988) find significant differences between pubic and private organizations. Lederer and Sethi (1988), however, still believed that due to bureaucracy, public ownership would result in more problems in obtaining resources and executing planning processes.

Implementation Determinants

SISP implementation is a stage following the generation of SISP output. Successful implementation activities are believed necessary to realize desired outcomes of IS planning. In practice, however, implementation of the strategic information plan remains problematic (Lederer and Sethi, 1988). Therefore, examining implementation factors that could lead to successful SISP is important. One implementation factor having being examined is the quality of implementation

mechanisms, which is found to have significant impacts on SISP success. Suitable implementation mechanisms include management control system for review and feedback, and top management involvement in monitoring the implementation (Raghunathan and King, 1988).

Environmental Determinants

Since IT can be used to support a firm's value chain, uneven levels of information intensity along the value chain increase the complexity of IS planning, thus affecting achievement of planning success. This analysis, despite this content validity, lacks support from empirical studies (Teo and King, 1997). Other external determinants, such as industry and volatility of environment, have been widely argued to have influences on the success of IS planning (Pyburn, 1983). Similarly, these assumptions have not been validated by empirical research. For example, Premkumar and King (1994) conducted a survey comparing manufacturing and service industries but failed to find any significant differences. Other external determinants, such as capabilities of consultants, have not been addressed in the literature base of this review. Table 2 summarizes the above analysis of previous research on determinants on SISP success.

Table 2. Summary of Determinants of SISP Success

	Operation-alization	Reliability and validity (Yes/No)	Test directly on SISP success? (Yes/No)	Representative studies
Business planning factors				
• Linkage between business and IT planning	Partially	No	No	Reich & Benbasat, 1996
• Sophistication of business planning	Yes	No	No	Lederer & Sethi, 1988
• Quality of business planning	Yes	No	Yes	Premkumar & King, 1994
SISP process				
• Descriptive categorization of SISP approach	No	No	No	Earl, 1993
• Planning process variables	Yes	Yes (both)	No	Segars et al, 1998a
• Planning horizon	Yes	--	Yes	Premkumar & King, 1994
Organizational factors				
• Top management participation and involvement	Yes	No	No	Earl,1993
• The role of IT	No	No	No	Pyburn (1983)
• Informal and formal IT relationship to business	Yes	Yes (both)	Yes	Premkumar & King, 1994
• Level of IT applications	--	--	Yes	Premkumar & King, 1994
• Size	--	--	No	Lederer &Sethi,1988
• Organizational ownership				
Implementation factors				Premkumar & King, 1994
• Quality of implementation mechanisms	Yes	Yes (both)	Yes	
Environmental determinants				
• Informal intensity along value chain	Yes	Reliability	No	Teo & King,1997
• Industry	--	--	--	--
• Volatile of environment	Yes	Reliability	No	Teo & King,1997

Methodology Critique

Analyzing approaches employed to operationalizing determinants of SISP success will reflect whether these determinants have been rigorously validated. Methodologies used to examine the determinants of SISP success include mainly surveys and field studies coupling with few case studies. Most samples are convenience samples and come from medium to large manufacturing, insurance and retail industries. The reason may lie in the assumption that larger

firms in information-intensive industries tend to have formal planning activities and planning experiences. Sample size varies from 8 to 600.

Some researchers use more than one methodology in their studies. For example, Pyburn (1983) used comparative case study, interview and survey. Using multi-methodologies in research is recommendable because consistent findings from multiple methodologies strengthen the credibility of the results. As indicated in table 2, while some studies attempted to obtain validity and reliability in their research, many studies (Lederer and Sethi, 1988; Earl, 1993) did not or limitedly address these issues, which weaken the results of their findings. Venkatraman and Grant (1986)'s summary of the status of business strategy research in the mid-1980s provides a good description of the current research on determinants of SISP success, "most existing measures…are either nominal (and/or single-item) scales that have questionable measurement properties or multi-item scales whose measurement properties (such as reliability, convergent and discriminant validity as well as nomological validity) have not been systematically assessed." Without rigorous measurements of determinants of SISP success, the assessment of SISP success remains problematic (Fitzgerald, 1993).

Besides the validity issues, the similarity of sample population among different studies limits the generalizability of their findings. Ignoring small, small-medium sized corporations may not be appropriate since small business tend to face different sets of problems than large firms do. This may be demonstrated by the failure to find external impacts on IS planning success. While some attempts have been made to include samples from diverse industries, a balanced approach would suggest the inclusion of smaller business firms in future studies.

Discussion and Conclusion

The review of previous studies on determinants on SISP success reveals that the following research issues needs to be addressed in order to promote theoretical development of SISP research. First, it would be appropriate to confirm relationships that have not been empirically tested, such as the linkage between the business planning and IS planning. Although the linkage between business planning and IS planning has been implied by many studies to have significant influence on SISP success, the assumption has not been empirically examined. We need to know not just why but also how the linkage affects SISP success. Empirically testing the assumption would give us an answer. Second, factors under one domain are interrelated to each other, as indicated by table 2. For example, the IT relationships to business and the level of IT applications are two factors under the role of IT. Developing a construct combining the two may represent more complete status of IT in organizations than just one of them does. Third, it would be useful to study relationship between determinants from different domains, such as IS role and planning practice. Investigating how they are linked together to obtain SISP success would be very helpful. Fourth, resolving inconsistent findings of previous studies is necessary. For instance, does size of a company matter in SISP success? Why and how? Fifth, a possible line of inquiry would be to include medium and small business from diverse industries in the studies. Comparing and interpreting differences in determinants of SISP success between business organizations with different size in various industries would be challenging. Sixth, comparing SISP success between public and private owned firms would be another interesting research direction. Recent case studies of Boyd et al. (1995) could be a useful stepstone. Finally, there are other opportunities including comparing the international differences in SISP success, such as between firms in U.S.A and U.K. Many studies that have been done in both countries have provided a rich base for the comparison.

Conclusion

Although prior research has identified the determinants of SISP, incorporating those determinants into a whole framework has largely been ignored. The particular focus in this study is on the comprehensive analysis of SISP success determinants. The article has reviewed determinants of SISP success from five domains and examined a number of critical theoretical and methodological problems on current research in the area. The result of this paper highlights the future research be directed at conceptualizing and developing valid measurements of key determinants of SISP success.

In summary, this study contributes to our understanding of determinants of SISP success in the following ways. First, it helps understand the relationships that have been firmly established, tentatively established, or not established. Thus, it provides directions for future research. Second, it assesses methodologies adopted, consequently identifies methodological problems. Third, it provides a framework for future analyzing and validating determinants of SISP success.

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