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The impact of organizational commitment, senior management involvement, and team involvement on strategic information systems planning

Vedabrata Basu[a,1], Edward Hartono[a,*], Albert L. Lederer[a,2], Vijay Sethi[b,3]

[a]*C.M. Gatton College of Business and Economics, University of Kentucky, Lexington, KY 40506-0034, USA*

[b]*Division of Strategy and Information Systems, Nanyang Business School, Nanyang Technological University, Singapore 639798, Singapore*

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Abstract

Organizational commitment, senior management involvement, and team involvement are typically expected to have a positive impact on the achievement of strategic information systems planning (SISP) objectives. That is, more commitment and involvement should produce greater success. However, they might also have a quadratic impact, specifically an inverted-U relationship such that after they reach an optimum, the achievement of the objectives diminishes.

A postal survey about planning practices and objectives produced usable data from 105 corporate information systems planners. Senior management involvement predicted the achievement of the objectives in a positive manner whereas organizational commitment predicted it in an inverted-U relationship. Future research should look more closely at these relationships. Planners should be more aware of the possibly detrimental effects of excessive planning.

Keywords: Strategic information systems planning; Organizational commitment; Senior management involvement; Team involvement; Strategic information systems planning success

1. Introduction

Strategic information systems planning (SISP) is an important management function. It can help an organization use information technology (IT) more competitively, identify new, higher payback IT applications, and better forecast IT resource requirements.

On the other hand, the failure to perform SISP well can cause opportunities to be missed and efforts to be duplicated. It can result in incompatible systems and wasted resources. In fact, today's highly competitive environment, with its rapidly changing IT, may aggravate the dangers of ineffective SISP more than ever before [24,64].

Hence, it is no surprise that both corporate general managers and information systems executives have viewed improved SISP as a key issue for sometime [8–10,15,51]. It is perhaps likewise no surprise that

* Corresponding author. Tel.: +1-606-257-2538.

E-mail addresses: ved_basu@yahoo.com (V. Basu), edhartono@usa.net (E. Hartono), lederer@ukcc.uky.edu (A.L. Lederer), avsethi@ntu.edu.sg (V. Sethi).

[1] Tel.: +1-606-257-2538.

[2] Tel.: +1-606-257-2536.

[3] Tel.: +65-7996142.

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chief executives have identified SISP as their top information systems concern [9,47].

As a result, researchers and other observers have been interested in successful SISP [4,69]. They have offered conceptual and empirical work suggesting that SISP success is a function of many variables. Among them are three organizational factors: (1) organizational commitment; (2) senior management involvement and (3) team involvement [12,14,20,27]. However, the studies of those variables have assumed a positive impact of them on SISP success. In other words, they have assumed that more of the predictor variables produce more of the predicted success.

The purpose of this paper is to test the relationships between the three predictor variables and SISP success by investigating not only the favorable effects of SISP, but also the potentially detrimental effect of excessive SISP. In other words, perhaps too much of a predictor variable can produce less success [49].

The paper begins with an overview of SISP, the description of relevant variables, and hypotheses. After the methodology section, data analysis and discussion follow. Implications for research and practice conclude the paper.

2. Overview of SISP

SISP is the process whereby an organization determines a portfolio of computer-based applications to help it achieve its business objectives [42]. It includes formulating IS objectives, defining strategies and policies to achieve them, and developing detailed plans to effect the strategies and policies [75]. A future analysis to predict changes over the expected life of the portfolio is used to set a reliable forecasting horizon where the organization can cope with a possible range of requirements at a permissible cost [41]. The forecasting horizon is then used to set a planning horizon for funds, human services, technical expertise, and the hardware and software capabilities needed to take advantage of any opportunities that may arise. If the planning horizon exceeds the forecasting horizon, changed requirements will probably render the plan irrelevant or even dysfunctional [41].

The SISP process is characterized by large-scale, comprehensive studies or by ongoing, smaller-scale ones [64]. An organization follows one of many similar, well-defined and documented methodologies or it customizes its own. It forms committees of users and information systems specialists. It often uses the methodology's vendor for training and guidance. It defines or revises a portfolio of applications, their priorities, databases, data elements, and the infrastructure to support them. SISP also provides a schedule for implementation.

More comprehensive studies are challenged by the necessity to complete the SISP quickly and inexpensively so as to maintain management interest and to implement plans before requirements change [41,64]. Less comprehensive studies are challenged by the necessity to provide sufficient detail to facilitate plan implementation and to furnish enough alternatives to cope with possible changing requirements in the future [61,62].

Thus, both excessive and insufficient study can be viewed as detrimental to the success of SISP. Planners must hence weigh carefully the comprehensiveness in their SISP studies so as to pay neither excessive nor insufficient attention to detail. In other words, observers have suggested that SISP be comprehensive enough to ensure that it provides a plan that can guide the organization, but that it also not be so excessive as to discourage management interest and hence be ignored [64].

3. Independent and dependent variables

Research has suggested that many variables predict SISP success. The independent variables in this study represent three organizationally oriented SISP ones. They are organizational commitment, senior management involvement, and team involvement.

3.1. Organizational commitment

Organizational commitment means company support for SISP [12]. Such commitment is indicated by the presence of sufficient resources for it [5,28,57]. For example, key people stay on the SISP study from its start to finish to maintain continuity [50]. Organizational commitment is evident when management controls SISP closely enough to resolve conflict among different organizational subunits [20,50], and when management's expectations for the results of

SISP are reasonable [36,50]. Highly credible SISP leaders and sponsors further demonstrate organizational commitment [72].

Organizational commitment has been shown to lead to effective SISP [2,20,28,50,66]. On the other hand, deficiency in organizational commitment has been shown as a major problem affecting SISP success [14].

3.2. Senior management involvement

Senior management involvement in SISP means that a top executive champions it [50]. Planners determine senior management's key planning issues [12,17]. They brief top executives with the SISP study's scope, objectives, and approaches to gain commitment [37]. Top executives provide feedback and guidance throughout the process [20]. Senior management is educated about IT [5,20,53,63].

Research has examined the critical role of such senior management practices in SISP success. Senior management involvement has been shown to lead to effective SISP [14,20,66]. Deficiency in such involvement [14] and understanding [48,63] have been shown as a major impediment to the favorable outcome of the SISP. Lack of senior management understanding has even led to major SISP failure [64].

3.3. Team involvement

The planning team includes both the user managers and information systems professionals. The importance of team involvement in the planning process is widely accepted by both researchers and practitioners [27,28,59].

Team involvement in SISP is indicated by the soliciting of planning inputs from the organizational levels responsible for plan implementation [7,12]. Keeping the planning team aware of business changes during SISP also reflects its involvement [19,28,36]. The selection of SISP team members (who are mostly users) on the basis of competence (rather than availability) [26,75] and their high credibility [23,72] also demonstrates their involvement. Moreover, educating IS personnel about organizational objectives and key issues so they can better support users [12,23], training SISP team members in the SISP methodology [10,14], and educating them about SISP scope and goals, the organization's mission and purpose, and its environment [12,14] are also critical elements of team involvement.

3.4. Strategic information systems planning success: the achievement of objectives

SISP success can be measured by the extent to which SISP achieves its objectives [43,58,68]. SISP can have many objectives. For example, SISP is done to facilitate the management and control of IT resources [7,13,29]. That includes forecasting IT resource requirements [28] and allocating IT resources [70].

SISP can also be done with the objective of helping an organization gain competitive advantage [2,21,33, 35,39]. In that regard, it can be used to identify new and higher payback applications [23,47], and to help align IT with business needs [11,16,18,21,40,60,74]. Moreover, it can help define new business strategies [55], identify strategic applications [19–21,73] as well as technology policies and architecture [20,73].

SISP can also be used with the objective of increasing top management commitment to IT [20] and improving communication about IT with users [23,28]. As a result, an objective can be to increase visibility of IT in the organization [70].

4. Hypotheses

Greater organizational commitment, senior management involvement, and team involvement are all expected to presage more successful SISP. Greater organizational commitment would result in more and better planning resources that could produce a higher quality plan that better accomplishes organizational objectives. Greater senior management involvement would provide better knowledge about organizational objectives and hence a plan that can accomplish them better. Such involvement would also lead planners to expect rewards for more successful SISP and thus encourage their efforts. Greater team involvement would provide more knowledge about organization operations, and hence a plan that addresses them better so that the organization could better accomplish objectives.

However, comprehensive SISP is challenged by the necessity to complete quickly and inexpensively so as to maintain management interest and produce a plan

before requirements change [41,64,67]. Therefore, excessive SISP may be viewed as detrimental to SISP success.

Excessive practice has been recognized as detrimental in the field of strategic business planning. For example, researchers have found a negative relationship between organization performance and the extent to which organizations try to be exhaustive in making and integrating strategic decisions [22].

In fact, considerable controversy prevails about whether strategic business planning is too comprehensive, and whether excessive planning lacks both a clear intellectual paradigm and a central core of professional practice [76]. According to Levy ([44], p. 81), planning itself simply ''does not seem to have any guiding principle or central paradigm''.

In SISP, possible reasons have been suggested to explain the potential detrimental effect of excessive senior management involvement on SISP success [2]. Conceivably, when top management is too involved, excessive bureaucracy obstructs progress. Too many details concerning resource allocation and usage must pass top management scrutiny and be approved. This could delay decisions by SISP team members.

Over-managing and over-controlling employees can, in fact, waste resources and destroy creativity [31,32]. The problem is so severe that one study suggested a ''temporal pacing method'' to help executives avoid excessive strategic planning [25].

The field of economics similarly warns of excessive inputs. The law of diminishing marginal returns states that the addition of input to a process first results in an increase in total output [65]. However, as input is added, the marginal output begins to decline and the total output begins to rise at a declining rate [45]. With the further addition of input, the marginal output becomes zero and the total output levels off. The total output has reached its optimal. With more input, the marginal output then becomes negative and the total output declines [71].

In summary, excessive organizational commitment, senior management involvement, and team involvement could presage less successful SISP. Excessive organizational commitment could result in excessive planning resources that would require excessive communication among planners, hence delay the creation or updating of the plan while the business changes, and thus result in the failure to accomplish objectives. Excessive senior management and team involvement could also delay the planning process and hence produce a plan that accomplishes objectives no longer valid.

Based on the above arguments, the relationships between organizational commitment, senior management involvement, and team involvement and SISP success would not only be positive, but also reach an optimum. Beyond this, as they continue to increase, SISP success would decrease. Hence, the following pairs of hypotheses tested both the more conventional, simple positive relationship as well as the inverted-U relationship.

H1.A. As organizational commitment increases, SISP success increases.

H1.B. As organizational commitment increases, SISP success increases until it (success) reaches a maximum; as organizational commitment continues to increase, SISP success decreases.

H2.A. As senior management involvement increases, SISP success increases.

H2.B. As senior management involvement increases, SISP success increases until it (success) reaches a maximum; as senior management involvement continues to increase, SISP success decreases.

H3.A. As team involvement increases, SISP success increases.

H3.B. As team involvement increases, SISP success increases until it (success) reaches a maximum; as team involvement continues to increase, SISP success decreases.

5. Methodology

5.1. Questionnaire

The research employed a questionnaire of four parts. In the first part, respondents indicated whether or not they had participated in a SISP study. If so, they continued to answer the rest of the questions. If not, they were instructed to return the survey.

The second part contained questions about the extent to which respondents' organizations followed particular SISP practices. The practices included groups of items for organizational commitment, senior management involvement, and team involvement. The items were based on literature about those variables reviewed earlier in this paper. They measured each indicator using a 5-point Likert scale. In this measure, ''1'' meant that the organization had followed the practice ''not at all''; ''2'' meant ''to a little extent''; ''3'' meant ''to some extent''; ''4'' meant ''to a great extent'' and ''5'' meant ''to a very great extent''.

The third part of the questionnaire asked about SISP success based on the objectives in the literature reviewed about them above. Respondents rated the extent to which SISP had achieved each objective. Table 1 identifies the practices and success items.

The fourth and final part of the survey contained questions about respondent and organizational demographics.

Table 1
The four factors and items with acronyms

Organizational commitment
*Sufficient resources were allocated to the SISP study (ORGCOM1)
*Organizational support was built for the SISP study (ORGCOM2)
*Management's expectations for the results of the SISP study were kept reasonable (ORGCOM3)
*SISP study leaders and sponsors had high credibility (ORGCOM4)
Key people stayed on the SISP study from its start to finish to maintain continuity (ORGCOM5)
*Management controlled the SISP study closely enough to resolve conflict among different organizational subunits (ORGCOM6)
Senior management involvement
Senior management was educated about IT (SRMGT1)
*The planning team determined senior management's key planning issues at the start of the project (SRMGT2)
*The planning team briefed senior management with the SISP study's scope, objectives, and approaches to gain its commitment at the project's start (SRMGT3)
*The planning team briefed senior management throughout the project to maintain its commitment (SRMGT4)
*Senior management provided feedback and guidance throughout the SISP study (SRMGT5)
*A top executive championed the SISP study (SRMGT6)
Team involvement
*Inputs were solicited from the organizational levels responsible for implementing the SISP plan (TEAM1)
*The planning team was informed about business changes taking place during the SISP study (TEAM2)
*SISP team members were chosen on the basis of competence (rather than availability) (TEAM3)
*SISP team members with high credibility were chosen (TEAM4)
*IS personnel were educated about organizational objectives and key issues (TEAM5)
Team members were trained in the SISP methodology (TEAM6)
Team members were educated about the scope and goals of the project, the organization's mission and purpose, and its internal and external environments (TEAM7)
Achievement of objectives
Align information technology with business needs (OBJ_ALGN)
*Gain a competitive advantage from information technology (OBJ_CA)
*Identify new and higher payback applications (OBJ_APP)
*Identify strategic applications (OBJ_STR)
Increase top management commitment to information technology (OBJ_COMT)
*Improve communication about IT with users (OBJ_COM)
*Forecast information technology resource requirements (OBJ_FORE)
*Allocate IT resources (OBJ_ALOC)
*Develop an information architecture (OBJ_ARCH)
*Increase the visibility of information technology in the organization (OBJ_VISB)

* Items that survived the model validation process described below.

Five experienced strategic IS planners pilot-tested the questionnaire. The authors asked these pilot subjects to identify any omissions, errors, or inconsistencies in it. Two of these planners completed it in the presence of the authors and three completed it in other cities. The three subjects in other cities faxed their completed surveys to the authors along with their notes on it about omissions, errors, or inconsistencies. One of the authors discussed these notes with them by telephone.

The pilot test resulted in the incorporation of several small revisions to the survey. These revisions included the rewording of a few questions to make them clearer, an adjustment to the scale for the extent to which the SISP practices were applied, and an alteration to the instructions to make them easier to follow.

5.2. Data collection

After the pilot test, the sample was carefully developed by triangulating information from multiple sources as to ensure data currency and validity. The 500 largest corporate IS users listed in *Information Week* were first supplemented with additional companies listed in the Corporate 1000 (a directory of the 1000 largest manufacturing and service companies). From this set, the sample comprised only those 840 companies whose complete addresses were also listed in *The Directory of Top Computer Executives*.

Questionnaires were mailed to the 840 companies listed in the sample. Of the 840, 199 firms returned the completed survey for a response rate of 24%. One hundred and five (53%) of these firms had participated in an SISP study and thus provided usable data. A comparison of early and late respondents (those replying before and after reminders) was done because significant differences between the two groups on relevant dimensions would indicate caution about sample representativeness [54]. The comparison showed little disagreement in SISP experiences. Such a finding is reasonable and enhances the generalizability of the results to the larger population.

The response rate of 24% is good considering that the questionnaire was seven pages long and fairly complex. It also exceeds that of other similar recent SISP surveys [2,21,75]. It thus suggests that the respondents found the topic important.

5.3. Demographics

The organizations represented a wide variety of industries and were typically large. On average, about 532 IS employees and 15,000 total employees worked for each. The annual revenue of the business unit averaged US$ 3.72 billion.

In general, the subjects were highly experienced. They had worked in their organizations and in IS for an average of 11.3 and 21 years, respectively. Their job titles showed them to be generally at fairly high levels in their organizations, and thus their views of SISP are of great interest. In fact, it has been suggested that senior IS managers can provide a broader organizational perspective of IS activities than individual department heads, who might have more parochial views [56].

Sixty-four (61%) of the SISP covered the entire enterprise while 27 (25.7%) covered the division and 5 (4.8%) covered a functional area. The average planning horizon of the SISP—the period during which the plans were to be implemented—was 4.8 years.

6. Data analysis

Confirmatory factor analysis (CFA) was used to examine the measurement properties of the four latent factors (organizational commitment, senior management involvement, team involvement, and achievement of objectives) in Table 1. Appendix A gives the details of the model validation.

A regression using ordinary least squares tested each hypothesis. For H1.A (organizational commitment predicts achievement of objectives), H2.A (senior management involvement predicts achievement of objectives), and H3.A (team involvement predicts achievement of objectives), a conventional positive model was used. For H1.B, H2.B, and H3.B (analogs to H1.A, H2.A, and H3.A, but with the dependent variable expected to appear as an inverted-U), a quadratic variable (i.e. the square of the independent variable) was also inserted.

Table 2 shows the results. It shows that the data support H2.A ($t = 2.81$, $P < 0.01$). It also shows support for H1.B for the quadratic term ($t = -2.32$, $P < 0.05$ for ORGCOM^2). The negative value of the coefficient in the regression further indicates that the

Table 2
Regressions on achievement of objectives

Relevant hypothesis	Variable	B	S.E.	β	t	P
The positive model: $R^2 = 0.36$; adjusted $R^2 = 0.33$; $F = 12.79^{***}$						
	Constant	−0.261	0.792		−0.329	0.743
H1.A	ORGCOM	0.328	0.318	0.166	1.033	0.305
H2.A	SRMGT	0.650	0.232	0.344	2.806	0.007**
H3.A	TEAM	0.293	0.195	0.206	1.506	0.137
The inverted-U model: $R^2 = 0.41$; adjusted $R^2 = 0.36$; $F = 7.77^{***}$						
	Constant	−8.849	3.896		−2.271	0.026
H1.B	ORGCOM	4.367	1.779	2.203	2.455	0.017*
H1.B	ORGCOM^2	−0.560	0.242	−2.045	−2.315	0.024*
H2.B	SRMGT	1.622	1.536	0.857	1.056	0.295
H2.B	SRMGT^2	−0.128	0.203	−0.507	−0.628	0.532
H3.B	TEAM	0.180	0.859	0.126	0.210	0.835
H3.B	TEAM^2	0.013	0.131	0.059	0.097	0.923

* Significant at 0.05 level.
** Significant at 0.01 level.
*** Significant at 0.001 level.

parabola opens downward as an inverted-U.[4] Finally, the table shows that the data do not support the other hypotheses.

In addition, variance inflation factor and variance decomposition proportion tests did not detect multicollinearity [46]. The scatter-plot of the standardized residuals against the standardized predicted values shows that there is no apparent change in the variability of the residuals, thus suggesting the absence of heteroskedasticity [38]. A visual examination of the normal probability plot of the residuals of the dependent variable suggested that they were normally distributed [46].

7. Discussion

This research found support for the simple positive hypothesis that senior management involvement predicted the achievement of SISP objectives. However, it did not find support for the analogous hypotheses that organizational commitment and team involvement predicted it. This suggests that in actual practice, as organizations increase their senior management involvement, they realize SISP objectives better. It does not suggest that the same holds in actual practice for organizational commitment or team involvement.

The research also found support for the hypothesis that as organizational commitment increases, SISP success increases until it reaches a maximum; as organizational commitment continues to increase, success decreases. This is consistent with the notion that too much planning (in terms of organizational commitment) can be detrimental to SISP success. It thus suggests the existence of some optimum level of organizational commitment.

The research failed to support the hypothesis that senior management involvement similarly predicted SISP success with an inverted-U shaped relationship. In other words, no maximum for such involvement was evident in the data. A simple explanation for the lack of support is possibly that senior managers simply do not over-manage and over-control actual SISP practice. In other words, despite the fact that the hypotheses make theoretical sense, in actual practice some distant right side of the inverted-U curve (where success would decrease) is not typically reached. On the other hand, the right side of the curve is reached for organizational commitment.

The research failed to support the hypothesis that team involvement predicted SISP success in either the positive or inverted-U context. Possibly users simply are not too involved in actual SISP practice

[4] The linear term for H1.B is also significant ($t = 2.46$, $P < 0.05$ for ORGCOM). However, this means only that the regression curve is shifted to the right along the x-axis, and is thus not important to the test of H1.B.

as measured in this study. Probably in contrast to senior management, such team involvement simply is not very important in actual SISP practice.

8. Implications for future research

This study confirmed that insufficient senior management involvement can be detrimental to SISP success. It also confirmed that excessive organizational commitment to SISP can be detrimental. The obviousness of the expected support for all three of the hypotheses makes much more interesting the finding that two constructs did not result in diminishing returns.

The finding that team involvement had no impact on SISP success is even more interesting. SISP teams are composed primarily of users and this finding counters most previous assertions and findings about them. Perhaps the users on the teams in the subject firms were not of sufficiently high level in their organizations. In any case, future research could attempt to explain why team involvement had no impact on SISP success.

Future research could also consider other SISP practices. This research focused on organizationally oriented practices For example, data architecture planning, cost justification, senior management leadership, and user management leadership might be interesting candidates for investigation. Problems with each can delay planning and thus impede its outcome.

This research used information systems planners to assess both the independent and dependent variables. Perhaps multiple respondents from the same organization would produce different findings.

This research used a dependent variable as a composite of related perceptual items. The notion of optimal relies on their mean and may be treated with caution. Future research might attempt to use a single, non-perceptual dependent variable. On the other hand, future research might use additional items. Organizational learning could be one of them.

This research used fairly specific practices to measure the independent variables. Perhaps more general descriptions of SISP activities would produce different results. Also, perhaps different measures of success such as financial outcomes, management satisfaction, or even other objectives might be used.

Finally, the research inspires questions about the predictors of the practices themselves. Future research might thus ask under what circumstances are insufficient or excessive SISP practices conducted. For example, does top management sophistication influence SISP practices? Also, does the stability of the business environment do so?

9. Implications for practice

The implication of this research for SISP planners is that more planning is sometimes, but not always better planning. Perhaps no practical constraint limits senior management involvement, but too much organizational commitment apparently impedes SISP.

This suggests that such planners be wary of insufficiency in the senior management involvement items in Table 1. For example, they should ensure that they determine senior management's key planning issues, brief senior management with the SISP study's scope, objectives, and approaches to gain its commitment, and receive its feedback and guidance. They should find a top executive to champion the SISP study.

It also suggests that planners be wary of the organizational commitment items in Table 1. Perhaps not enough or too much effort is spent building organizational support or keeping management's expectations reasonable. Perhaps not enough or too much effort is spent obtaining credible leaders and resolving conflict.

Perhaps insufficient resources are available. On the other hand, may be too many resources create bureaucratic delays. During these delays, business objectives, managers, and users might change. These changes might prevent SISP objectives from being achieved.

The thoughtful reader might wonder: could insufficiency or excess in these apparent assets (resources, conflict resolution, credible leadership, organizational support, and reasonable management expectations) actually be impeding SISP in my organization? This research suggests that they might. Thus, the planner should examine them closely in his or her own organization.

Probably, the planner should also examine other practices closely. Although not examined in this research, insufficiencies or excesses in them might also impede the achievement of SISP objectives.

Table 3
Goodness-of-fit indices for each step in model validation

Index	Model 1[a]	Model 2[b]	Model 3[c]	Model 4[d]	Model 5[e]	Model 6[f]	Model 7
Satorra–Bentler scaled Chi-square	578.62	539.53	490.97	432.00	392.45	349.50	272.56
Degrees of freedom	371	344	318	293	269	246	224
Satorra–Bentler scaled Chi-square/d.f.	1.56	1.57	1.54	1.47	1.46	1.42	1.22
Comparative fit index (CFI)	0.79	0.80	0.81	0.84	0.85	0.86	0.92
Robust comparative fit index (RCFI)	0.83	0.84	0.85	0.87	0.88	0.89	0.94

[a] TEAM6 was deleted from the original model (Model 1) because its loading was not significant as indicated by its *t*-value ($t = 1.738$) to produce Model 2.

[b] TEAM7 was deleted to produce Model 3 because it cross-loaded with organizational commitment and senior management involvement, factors other than its causal team involvement.

[c] ORGCOM5 was deleted to produce Model 4 because it cross-loaded with senior management involvement and team involvement, factors other than its causal organizational commitment.

[d] OBJ_ALGN was deleted to produce Model 5 because it cross-loaded with team involvement, a factor other than its causal achievement of objectives.

[e] SRMGT1 was deleted to produce Model 6 because it cross-loaded with achievement of objectives, a factor other than its causal senior management involvement.

[f] OBJ_COMT was deleted to produce Model 7 because it cross-loaded with senior management involvement, a factor other than its causal achievement of objectives.

10. Conclusion

Strategic information systems planning is an important and challenging management function. Chief executives, corporate general managers, and information systems executives want to improve it. Perhaps careful assessment of the extent of planning practices can help them do so.

Appendix A. Model validation

Confirmatory factor analysis (CFA) was used to examine the measurement properties of the four latent factors (organizational commitment, senior management involvement, team involvement, and achievement of objectives) in Table 1. Because the Kolmogorov–Smirnov test rejected the null hypothesis of data normality ($P < 0.001$), the robust EQS software program from Multivariate Software, Inc., was used [6].

The measurement model was repeatedly modified to improve its goodness-of-fit with the data by dropping items based on non-significant loadings or cross-loadings [34]. The Satorra–Bentler scaled Chi-square (SBS χ^2), d.f., SBS χ^2/d.f., comparative fit index (CFI), and the robust comparative fit index (RCFI) were used to assess goodness-of-fit. SBS χ^2 was chosen because the data were not normally distributed. A value of the ratio SBS χ^2/d.f. below 2 indicates a good fit [34]. CFI and RCFI values >0.90 indicate a good fit [34]. Table 3 shows the analysis.[5]

The scores of items for each construct for the final model were combined using the factor score method [30] to compose a five-item organizational commitment index, a five-item senior management involvement index, a five-item team involvement index, and an eight-item IS success index. A reliability assessment found respective Cronbach's α of 0.79, 0.87, 0.81, and 0.90, all well above Nunnaly's [52] recommended minimum of 0.60. Also, all items loaded on their respective factors at a statistically significant level ($P < 0.05$), thus supporting the convergent validity of the factors [1].

A Chi-square difference test [1,3] and confidence interval test [1] examined all possible pairs of factors to assess discriminant validity. The Chi-square difference test supported it by showing that the Chi-square values for the models whose factors were allowed to

[5] One of the 10 outcome items in the success variable, increase top management commitment to information technology (OBJ_COMT), strongly resembles the name of the senior management involvement practice construct. It also resembles some of its practice items. However, it was dropped in the model validation process.

covary were significantly lower than the models whose factors of interest were fixed at one. The confidence interval test supported it by showing that all the upper and lower boundaries of the intervals around the correlation between factors did not include the value of 1.0.

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Vedabrata Basu is completing his PhD in decision sciences and information systems in the C.M. Gatton College of Business and Economics at the University of Kentucky. He holds a BS in Agricultural Sciences from the Banaras Hindu University, India and an MBA from the Indian Institute of Management, Ahmedabad. His major research interests are customer relationship management and early warning systems.

Edward Hartono is completing his PhD in decision sciences and information systems in the C.M. Gatton College of Business and Economics at the University of Kentucky. He holds a BS in Electrical Engineering from Trisakti University in Indonesia and an MBA from Suffolk University. His major research interests are management information systems and knowledge management.

Albert L. Lederer is Professor of management information systems in the School of Management of the C.M. Gatton College of Business and Economics at the University of Kentucky. He has degrees in psychology, computer and information sciences, and industrial and systems engineering. His research focuses on information systems management and has appeared in many journals.

Vijay Sethi is Professor in the Information Technology and Operations Management Division at the Nanyang Business School, Nanyang Technological University, Singapore. He specializes in electronic commerce, strategic information systems planning, IT productivity, and knowledge management. His articles have been published in many international and local journals.