An Assessment of Perceptual Differences Between Informants in Information Systems Research

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(Received October 1996; accepted after revision June 1997)

Although survey research is the most widely used methodology in organizational and information systems (IS) research, it is often criticized for the perceptual biases involved in using a single key informant per firm. To mitigate this problem, researchers commonly advocate using more than one key informant per firm. However, it is not uncommon for perceptual differences between key informants to arise in such studies. This study examines possible reasons for such perceptual differences by gathering data through a ‘matched-pair’ mail survey complemented with follow-up telephone interviews with key informants. The results show that perceptual differences between Business Planners and IS Executives with regard to the extent of integration between business planning (BP) and information systems planning (ISP) may be caused by inherent differences in their roles and responsibilities, by the ‘education gap’, ‘communication gap’ and/or ‘culture gap’ between Business Planners and IS Executives, by the dynamic nature of the evolutionary process of BP-ISP integration, and by the natural tendency of IS Executives to perceive IS processes to be more sophisticated than others perceive them to be. These results should be useful both to researchers, who can use them in designing future studies and to practitioners, since they suggest the nature of, and possible reasons for, perceptual differences concerning IS among top-level executives. © 1997 Elsevier Science Ltd

Key words—perceptual differences, IS planning, integration, alignment, multiple informants

Strategic planning for information systems (IS) has consistently been ranked among the top issues facing IS researchers and practitioners [1–4]. A key element of strategic information systems planning is the degree of integration between business planning (BP) and information systems planning (ISP), which is here called ‘BP–ISP integration’. Although BP–ISP integration has been recognized by both IS researchers and practitioners to be important, research in this area is still relatively sparse.

This paper reports on some methodological issues encountered in a study of BP–ISP integration. The substantive results of the study have been reported elsewhere [5, 6]. The focus here is on exploring possible perceptual biases in the mail survey data collection methodology that was used in the study. Specifically, this study examines whether the commonly advocated notion involving the use of multiple key informants per firm in order to reduce common source variance may itself give rise to the problem of perceptual differences between key informants.

Previous research in both the organizational and IS literatures has found that perceptual
differences do commonly occur among informants. For example, Wilkes and Dickson [7] found evidence that the lack of progress in defining measures of IS performance may stem from perceptual differences among key informants. In a study of strategic planning in hospitals, Zigli, Gilmore and Williford [8] found that there were significant perceptual differences among key informants concerning industry characteristics and competitive dimensions. Kumar, Stern and Anderson [9] commented that when data are collected from multiple key informants in the same firm, high levels of congruence often failed to occur.

The results of the study should be of interest to researchers in designing studies and to practitioners who may better understand the nature of, and reasons for, perceptual differences that may exist among executives regarding important organizational phenomena.

1. DESCRIPTION OF THE UNDERLYING STUDY

The research study that underlies the methodologies/assessments reported on here focused on a typology that described various levels of BP–ISP integration. The perceptions of Business Planners and IS Executives with regard to each firm’s practices were gathered in terms of this typology through a ‘matched-pair’ survey. Any perceptual differences that appeared to exist between the two senior executive informants in each firm as well as the reasons for such differences were investigated through follow-up telephone calls.

1.1. The BP–ISP integration typology

Based on the descriptive, prescriptive and empirical research of King [10], IBM [11], King and Zmud [12], King [13], Synnott [14], Jang [15] and Goldsmith [16], a typology of BP–ISP integration was developed and used in the underlying study. The typology identifies four distinct levels, or types, of BP–ISP integration:

Type I: separate planning with administrative integration;
Type II: one-way linked planning with sequential integration;
Type III: two-way linked planning with reciprocal integration;
Type IV: integrated planning with full integration.

These four BP–ISP integration levels are depicted conceptually in Fig. 1 and are described as follows [5, 6]:

Type I: Administrative integration.
In this type of integration, there is a weak relationship between Business Planning (BP) and Information Systems Planning (ISP) as shown by the dotted line in Fig. 1a. Generally, there is little significant effort to use information technology (e.g. computers, telecommunications) to support business plans.

Type II: Sequential integration.
In this type of integration, a sequential relationship exists between BP and ISP. BP provides directions for ISP. This relationship is denoted above by a unidirectional arrow flowing from BP to ISP in Fig. 1b. ISP primarily focuses on providing support for business plans.

Type III: Reciprocal integration.
In this type of integration, there is a reciprocal and interdependent relationship between BP and ISP. There are therefore two arrows as shown in Fig. 1c; one arrow flowing
from BP to ISP, and the other arrow flowing from ISP to BP. ISP plays a role both in supporting and influencing business plans.

Type IV: Full integration.

In this type of integration, there is little distinction between the BP process and the ISP process. Business and information systems strategies are developed concurrently in the same integrated planning process as shown by the single box in Fig. 1d.

Each successive type describes an increase in the level of BP–ISP integration, thereby possibly raising the strategic potential of IT and enabling more effective alignment between IS and business strategies. The roles of ISP and the IS function in Types 1 and 2 are essentially reactive in nature since they have negligible influence on business strategies. Conversely, the roles of ISP and the IS function for Types 3 and 4 are more proactive in nature since they play a role in both supporting and influencing business strategies.

An evolutionary model using these integration types has been empirically tested (see [5]). Although the evolutionary notion is not implicit in the assessment performed here, it is none the less interesting to note that many firms evolve through the various stages from levels of lesser integration to levels of greater integration.

1.2. Research methodology

1.2.1. The sample. A random sample of 600 firms was obtained from the Corporate 1 000 book [17]. This book lists the top 1 000 corporations in the USA, as well as the names of their respective senior executives. The sample was taken from this source because listed firms are generally medium to large in size, and consequently are likely to have more experience in ISP than smaller firms.

Questionnaires were prepared and sent directly to the CEO with instructions requesting him/her to forward the questionnaires to the Senior Business Planner and the Senior Information Systems Executive. The directions for distribution directed that if ISP is carried out centrally at the corporate level for most business segments (i.e. divisions or business units), the questionnaires should be forwarded to the Senior Business Planner and the Senior Information Systems Executive responsible for BP and ISP at the corporate level. Conversely, if ISP is carried out independently in each business segment (i.e. division or business unit), the CEO was asked to select a core business segment, and forward the questionnaires to the Senior Business Planner and the Senior Information Systems Executive responsible for that core business segment.

1.2.2. The instrument. The four different types of BP–ISP integration (administrative integration, sequential integration, reciprocal integration and full integration), together with their conceptual portrayal (similar to Fig. 1), were described in the instrument. The description of each type was identical to that given in Section 1.2. Both Business Planners and IS Executives were asked to indicate the type of BP–ISP integration that most closely matches their firm’s current level of BP–ISP integration.

Since the wordings used in questionnaires influence the extent of errors and biases [18], time and effort were spent during the development of the instrument which was iteratively refined through a series of pretests using doctoral and MBA students, IS practitioners and graduate business school faculty members over a period of about three months. The pretests resulted in changes to the wordings of certain items to enhance clarity and minimize ambiguity.

The pretests also revealed that it is important that informants be selected from the same organizational unit since different units of the same corporation might practise different types of integration. Hence, as a validation check, informants were asked to indicate the organizational level (i.e. corporate, division or business unit) for which they were responding as well as to provide the name of the unit. The method of distributing the questionnaire to either the corporate level or to a business unit that was described earlier was also devised as a result of this pretest.

1.2.3. Response analysis. Two follow-up mailings were made; the first and second follow-ups were made about three and seven weeks from the date of initial mailing. Forty-five firms declined participation citing one or more of the following reasons: company policy not to respond to any questionnaire, lack of manpower, or company currently undergoing restructuring. Nine firms whose informants were from different organizational units were
A summary of the characteristics of key informants is shown in Table 1. Informants come from a wide range of industries with a predominance of manufacturing firms. The annual sales revenue is widely distributed, in the anticipated medium to high range, from below US$300 million to above $5 billion. The number of employees in each firm varies although there is a predominance of firms with more than 10,000 employees. The job titles confirm that informants are almost exclusively senior executives (more than 70% of informants are at the director level or higher) who could reasonably be expected to be knowledgeable about the BP–ISP processes in the firm.

Comparisons (using chi-square tests) between informants and non-informants were made in terms of industry representation, annual sales revenue and the number of employees. The results confirmed the absence of non-response bias.

2. ANALYSIS OF PERCEPTIONS: UNDERSTANDING THE DATA

The first step in the methodological analysis was based on using some simple measures and procedures to explore and understand the reasons for perceptual agreement and disagreement. Among the firms that responded to the survey, 62.4% of the ‘matched-pairs’ of informants independently gave responses that were identical. The remaining 37.6% disagreed on their current type of integration.

Table 2 presents the data showing the differences in perceptions between Business Planners and IS Executives.

2.1. Understanding the agreements

‘Matched-pairs’ of IS Executives and Business Planners with identical perceptions are indicated by the diagonal cells in Table 2. By summing up the cells along the diagonal, we get 98 firms out of the 157 firms (or 62.4%) with identical perceptions. We carried out a z-test to test the null hypothesis that the proportion of agreement should be equal to 50% (since
respondents can either agree or disagree on their perceptions). The results rejected the null hypothesis and shows that the proportion of agreement is significantly greater than 50% (\(z = 3.11, p < 0.05\)). We obtained similar results using Kendall’s test of concordance (\(W = 0.84\), chi-square = 261.2, \(p < 0.05\)). Hence, overall, more firms agree about their type of integration than disagree.

An agreement index can be calculated by dividing the number of matched-pairs (firms) which agree by the average number of firms for each type of integration. For example, the agreement index for administrative integration can be calculated as \(\frac{6}{\{(19 + 17)/2\}}\). This agreement index of about 33% is the lowest of the four categories. These agreement indices suggest a rough validity test in that the level of agreement increases as the level of integration increases. The agreement index is 33% for administrative integration (I), 61% for sequential integration (II), 70% for reciprocal integration (III) and 82% for full integration (IV).

A possible explanation for this is that the higher three levels of integration represent increasingly substantial conscious choices regarding the importance of the IS function that must be made and implemented by top managers of the firm. Type I may be the 'default mode'; if a conscious choice has not been made, agreed on, and implemented in the firm, it is the level of integration that is extant. In such a situation, IS Executives and Business Planners may not be in very close contact with each other, and it is therefore unsurprising that they might give different perceptions.

However, in this Type I situation, some managers—either Business Planners or IS Executives—may be operating at a more sophisticated level on an experimental or prototyping basis. In some cases, this may be done informally until results can be observed. In such instances, we might expect high levels of perceptual disagreement.

Once a firm has decided to leverage IT to support business strategies by moving beyond administrative integration, greater common areas of activity and interest may be consciously created between Business Planners and IS Executives. These successively higher levels of agreement and common experience thereby perhaps explain the higher agreement indices at later types of integration. At successively higher levels of integration, the contributions of IS to business planning also tend to become more salient and direct as IS Executives participate more actively in business strategy formulation and implementation. This may tend to ‘imprint’ the nature of their shared experiences to a greater degree than at lower levels of integration.

Therefore, we conclude that the progression of increasing levels of agreement at successively higher levels of integration is sensible and that it strengthens the face validity of the results.

### 2.2. Understanding the disagreements

The perceptual differences between ‘matched-pairs’ of Business Planners and IS Executives are shown in the off-diagonal cells in Table 2. The relatively high percentage of disagreements (37.6%) in Table 1 suggests that there may be measurement error. However, if we consider the four types of integration to roughly approximate an evolutionary sequence, we note that the vast majority (97.5%) of perceptual differences are small in the sense that they do not differ by more than one level of integration.

The possibility of substantial measurement error is more remote than the existence of perceptual differences between Business Planners and IS Executives. Substantial

<table>
<thead>
<tr>
<th>Business Planners (BP)</th>
<th>Type 1</th>
<th>Type 2</th>
<th>Type 3</th>
<th>Type 4</th>
<th>Total (BP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>6</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>19</td>
</tr>
<tr>
<td>Type 2</td>
<td>11</td>
<td>44</td>
<td>24</td>
<td>0</td>
<td>79</td>
</tr>
<tr>
<td>Type 3</td>
<td>0</td>
<td>8</td>
<td>41</td>
<td>3</td>
<td>52</td>
</tr>
<tr>
<td>Type 4</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Total (IS)</td>
<td>17</td>
<td>65</td>
<td>65</td>
<td>10</td>
<td>157</td>
</tr>
</tbody>
</table>

**Note:** Numbers within cells indicate frequency

**Key:**
- Type 1: Administrative integration
- Type 2: Sequential integration
- Type 3: Reciprocal integration
- Type 4: Full integration
measurement error is made less likely because the instrument has been extensively pretested and modified iteratively over a period of more than three months with IS practitioners, graduate faculty members, MBA/MOIS students and doctoral students.

As a check of this, telephone calls were made to informants to determine whether they had any difficulty in understanding or distinguishing among the descriptions of the four types of integration. The results of these telephone interviews showed that none of the telephone informants had any difficulty in understanding or distinguishing among the four different types of integration. In fact, one informant commented that the four types of integration are 'nice concepts' for understanding BP–ISP integration.

Hence, based on extensive pretesting as well as telephone interviews with informants, there does not appear to be a great likelihood of substantial measurement error.

3. ANALYSIS OF CAUSES FOR DISAGREEMENTS

During the telephone interviews, informants were also asked to comment on perceptual differences (if any) between their responses and their colleague's responses. The comments provide additional data that may be useful in understanding the causes of perceptual differences. These data indicate that there are four possible reasons for perceptual disagreements between Business Planners and IS Executives.

First, differences in the roles and domains of Business Planners and IS Executives can result in perceptual disagreements since they are more knowledgeable about their own roles and responsibilities than with those of others. Since the roles and responsibilities of Business Planners are generally broader than those of IS Executives, these differences in the scope of work may reflect a better understanding of the 'big picture' on the part of the business planner. This is consistent with previous research which shows that the views of senior executives differ because their organizational roles influence their interpretations of events [19, 20]. In addition to organizational roles, past experiences also influence senior executives' perceptions as shown by the following quotes from the interviews:

"My responses are based on my past experiences and perceptions" (VP, Business Planning and Information Services).

"My responses are based on my work experience" (Information Systems Manager).

The data appear to confirm the existence of perceptual differences as shown in the pie chart in Fig. 2 which is divided into three sectors: similar perceptions (BP = IS), dissimilar perceptions where Business Planners perceived the firm to be at an earlier type of integration than IS Executives (BP < IS), and vice versa (BP > IS).

The pie chart in Fig. 2 also suggest a second possible explanation for the disagreements. Research on attribution theory [21, 22] has found that employees generally tend to attribute greater contribution to themselves than to others. It seems likely that there may be a tendency for IS Executives to attribute greater importance to IS roles in business planning than do the Business Planners. It is therefore not surprising to note that there are more cases where IS Executives (when compared with Business Planners) perceived that their firms are at a more advanced level of integration than vice versa. Specifically, the pie chart shows that when there were disagreements, the Business Planner assessed the level of integration to be
lower more than twice as often as the IS Executive made a similar assessment of a lesser level of integration.

A third possible explanation for the perceptual disagreement relates to the existence of an ‘education gap’, ‘communication gap’ or ‘culture gap’ between Business Planners and IS Executives. Galliers [23] noted that providers and users of IT tend to have different views about the contribution that IT can make to business. These different viewpoints are symptomatic of an ‘education gap’ and/or ‘communication gap’ between business and IS management. Grindley [24–26] found that IT directors identified the ‘culture gap’ between IT professionals and business colleagues as a key factor in limiting the successful utilization of IT in their companies.

This ‘culture gap’ is often caused by the failure of business management to appreciate the potential of IT in improving organizational performance and/or the failure of IS management to appreciate the business implications of IT. As a result of such a ‘culture gap’, it becomes very difficult for business management and IS management to share a common vision as to how IT can best be deployed.

Hence, the existence of ‘education, communication and/or culture’ gaps may lead to perceptual disagreement between Business Planners and IS Executives. Evidence of the awareness of such a gap can be seen from the following quote:

“I am aware that the IS management team view BP–ISP integration to be at a more mature stage than me. My firm is presently trying to better integrate business and IS planning activities” (VP, Business Planning and Information Services).

There also appear to be three possible explanations for perceptual differences that are created by the dynamic nature of BP–ISP integration in the enterprise:

- differences caused by time lags between reality and the perceptions of some people in the firm;
- differences created because some informants provide responses on the basis of their expectations for the future rather than the reality of the present;
- differences that are based on transitional phenomena.

Perceptual differences may be caused by the time lag between when the firm moved to a new level of integration and when it is perceived, both by Business Planners and IS Executives who may not be directly involved in ensuring that decisions to attain higher levels of integration are actually attained. For example, in some firms, the IS Executives indicated that they moved to the current type of integration fairly recently—less than one or two years ago. It undoubtedly takes some time before this new type of integration is implemented and adopted widely or perceived by other executives.

Perceptual differences may also be caused because some informants give responses that are based on their expectations for the future rather than on the reality of the present. For instance, consider the following quotes:

“It seems that we just have a difference of opinion as to the type of integration. However, my firm is definitely moving toward a two-way relationship” (Information Systems Manager).

“The past year we have started discussing strategies, reporting structures, etc. I feel that we will be making major changes next year” (Business Systems Manager).

“Up to now the business has seen IS as more of a static support organization of non-strategic value. Recently, there was a major restructuring with more than 50% replacement of managerial staff. The new management recognizes that we can no longer do things the old way. I see the IS function as becoming more proactive in the future” (Director, Planning and Architecture).

The dynamic nature of the BP–ISP integration process also undoubtedly means that some firms may be in a transition phase in between types of integration, using a hybrid of different types of integration. Hence, firms might show a mixture of characteristics that are
Teo, King—An assessment of perceptual differences

relevant to more than one type of integration. Hybrid types of integration typically occur when different business units and divisions are at different types of integration. The following quotes from informants provide the evidence to support this notion:

"Depending on the specific goals, more or less both sequential and reciprocal methods work as needed. However, sequential integration is typical" (Asst. VP, MIS).

"Overall, sequential integration is typical, though reciprocal and full integration are also applicable for some units" (Exec. VP, MIS).

"I am responsible for business planning at the corporate level, lead the strategic planning efforts for all of our divisions, and am the director of business systems/MIS at one of the largest divisions.

Ours is a large multi-divisional company. Each division is responsible for business and systems planning.

Some divisions are fully integrated, some are reciprocal, and most are integrated administratively.

The fully integrated division is one where the same person is responsible for the development of the strategic business plan and the MIS function. The divisions with reciprocal integration have local MIS management reporting to the Division GM. Divisions with administrative integration are smaller in size and receive MIS support from a corporate function" (Director, Planning and Business Systems).

4. LIMITATIONS

This study has one main limitation. Due to its exploratory nature, we are unable to draw firm causal inferences regarding the causes of perceptual differences. As such, we are unable to link specific factors to specific types of integration. However, since the aim of this study is to explore possible reasons for perceptual differences rather than determining causal inferences, this limitation is not viewed as serious.

5. IMPLICATIONS AND CONCLUSIONS

The measurement of the extent of integration by comparing responses from two informants—a Business Planner and an IS Executive—confirms that differences in perceptions can exist within a firm. This implies that senior executives do not necessarily perceive the phenomena, and by inference, other important organizational phenomena, in the same manner. These differences in perceptions are probably caused by inherent differences in their roles and responsibilities, by an ‘education gap’, a ‘communication gap’ and/or ‘culture gap’ that may exist between Business Planners and IS Executives, by the dynamic nature of the evolutionary process of BP–ISP integration, and by the natural tendency of IS Executives to perceive IS processes as more sophisticated, and therefore more important to the firm, than others may perceive them to be.

Interestingly, there are less perceptual differences as the level of integration rises, thereby indicating that there is more congruence in perceptions as the role of the IS function becomes more strategic. This is not surprising because in order for strategic use of IT to be successful, both Business Planners and IS Executives need to share a common vision as to how IT can be more effectively deployed to serve organizational goals and objectives. At higher levels of strategicity, there should also be greater awareness among all organizational participants of everything having to do with IS, since it is more likely to be important to everything that the firm does.

The differences that do exist, particularly at lower levels of integration, suggest the need for better communication between the IS function and business managers. While it is not necessarily essential that all business managers have a detailed understanding of how ISP is performed, effective overall planning does require such understanding on the part of the planners. It is important to realize that it is only
through greater BP–ISP integration that both Business Planners and IS Executives can share a common vision as to how IT can be better deployed for strategic purposes. This notion is supported by Sambamurthy, Venkataraman and DeSanctis [27] who found that the degree to which members of a planning group share the same goals, priorities and preferences relative to the organizational use of IT is a key factor in affecting the quality of the planning process. In addition, Byrd, Sambamurthy and Zmud [28] found that consensus on planning issues is important in developing good quality plans.

Practitioners may use the typology from this study to identify whether there is any perceptual congruence between Business Planners and IS Executives in their firm with regard to the extent (type) of integration. Resolving these differences in perceptions would help to pave the way for greater understanding of the role of the IS function, and consequently encourage greater IS contributions to organizational performance. Practitioners must also realize that higher levels of BP–ISP integration are not achievable without considerable conscious efforts by both Business Planners and IS Executives in resolving any ‘education gaps’, ‘communication gaps’ and/or ‘culture gaps’ that exist between them.

The perceptual differences that have been identified and assessed here also highlight that it is important for researchers who are using only a single informant to select the appropriate informant wisely, as a different key informant might possibly lead to significantly different research findings. This implies that the use of convenience sample in IS research should be critically evaluated to ensure that informants are in a position to have information or knowledge about the phenomena being investigated. Furthermore, research with unusual or unexpected findings should also be examined to ensure that the informants used are appropriate for the phenomena under study.

Specifically, we recommend that future research using matched-pair design should at least conduct telephone interviews with informants in order to try to resolve perceptual differences as well as to better understand the reasons for perceptual differences between informants. In other words, research encompassing both quantitative (e.g. surveys) and qualitative (e.g. interviews) as well as other forms of data triangulation are strongly encouraged. Such research would not only lead to greater validity of findings but would also lead to a better understanding of the phenomena under study.

REFERENCES


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