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WHAT IS AN "END-USER"? IDENTIFYING MULTIPLE RELATIONSHIPS AMONG INFORMATION SYSTEMS USERS

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ABSTRACT

The relationship of the computer user to the system and to the information gained is a subtle one, and in organizations many different types of relationship are possible. Previous definitions of "user" and "end-user" emphasize *direct* interactive forms of computer use and do not cover indirect relationships; they also do not take into consideration the *reason* for the interaction. A new definitional framework is required which encompasses the different modes and purposes of IS users. This paper proposes a two-dimensional typology which employs an **association** dimension and a **purpose** dimension in order to identify the nature of the relationships more accurately. The association dimension indicates how *close* the user is to the information source; the purpose dimension indicates what the user *does* with the information. The new typology will help to clarify the subtle and changing relationships between computer users, systems and IS support staff.

1. INTRODUCTION

This paper seeks to clarify the relationships which occur in the context of computer-based information systems generally, and interactive information systems for managers and other knowledge workers in particular. The approach taken is one which examines information system (IS) concepts from the point of view of the human activity involved. All of us are IS users in one way or another. Perhaps we interact with a PC and create spreadsheets or typed documents or access an electronic mail system. If we do not do that, we probably receive information in the form of computer-printed reports from a variety of different commercial sources. Almost everybody interacts with computerized banking and retailing systems. Even if we sedulously avoid the outward trappings of information technology, we will still receive computer-generated information via more indirect routes: however remote from the original electronic source, computer data is incorporated by various routes into formal reports and analyses, word-of-mouth narrations, and then into discussions, arguments, rumors and hearsay.

Managers receive information from a rich variety of internal and external formal and informal sources. Mintzberg (1977) discusses the drawbacks of purely formal systems and identifies reasons why managers rely on a wide range of formal and informal sources. However, even when the source is a formal one, the role of computer-generated information in decision-making is not straightforward; Jones and McLeod (1986) point out that the presence of information chains in the decision process brings information from formal systems to the senior manager via a number of different routes.

Even if we are all "Information System users" in some broad sense, it is necessary to distinguish between different *kinds* of user. There is more than an element of confusion which arises in discussions on two major IS growth areas. One area is the development and accessing of data systems by non-DP professional staff, End-User Computing (EUC). The other, closely allied field is the support of managerial decision-making through Decision Support Systems (DSS) and Executive Information Systems (EIS).

Both of these areas are significant because they represent major growth trends in IS emphasis (see Benson 1983; Gerrity and Rockart 1986). The growth of end-user computing reflects improvements in two technologies: one is the mainframe- or mini-based terminal and the other is the personal computer, the PC. The former technology is by far the older and has seen substantial improvements in software availability including, especially, fourth generation languages designed to ease the path of non-technical users (Martin 1982). The latter technology has benefited from very substantial reductions in hardware cost, such that the PC is now available to a large proportion of managers and information workers (Lee 1986).

There are several underlying reasons for the major growth in EUC, but one factor may be the perceived dissatisfaction with the delays and inflexibility associated with the traditional IS department (Leitheiser and Wetherbe 1986). Events in the IS industry are driven to some extent by major hardware and software suppliers, whose outlook has been traditionally geared towards the IS specialist, the "users," who play a major part in IS design, selection and specification. The rather ugly term "end-user" was coined to refer to people outside the IS department who sit at terminals, receive printouts and act on information

received. The unfortunate choice of words signals an attitude, a view on the outside world from within. It also implies that the real information consumer is not only remote from the heart of the matter (which is indeed often the case), but also that this role is somehow less important.

Research into the rapidly expanding topics of EUC and managerial IS use is an active concern and the subtlety of the relationships among the various human and system components calls for a review of key definitions. In particular, a new definitional framework is required which encompasses the different modes and purposes of IS users.

2. DESCRIBING IS USERS

There are a number of different aspects of IS use and these resolve into several ways of categorizing users. Sipior and Sanders (1989) identify some of these categorizations:

- DP professionals versus non-DP professionals
- PC versus mainframe users
- developers versus non-developers
- frequent versus infrequent users
- experienced versus inexperienced users
- user functional areas (accounting, marketing, etc.)
- management levels (top, middle and junior management)

There are many others. The distinction between DP professional and non-DP professional is the most frequent distinguishing characteristic of the end-user, although several other definitions have been developed. For example, Rockart and Flannery (1983) identify end-user computing simply as computing which is "user-developed and operated." More specifically, Alavi (1985) suggests that EUC means that "the user of the results...also creates the software specifications necessary to effect the computing itself." In contrast with these approaches, Yaverbaum (1988) defines an end-user as anybody who is *not* a programmer or systems analyst. Sipior and Sanders (1989) provide a broad definition of EUC which includes "development and use...by non-DP professionals...either directly interact[ing] with the computer or...a task leading to direct interaction." There are many other definitions and it is not the purpose of this paper to add to them.

The key point is that EUC is seen as being mainly about computing by non-DP professionals. This viewpoint misses the crucial relationships between system, user and IS department which occur when organizational IS users interact. What is needed is a means of clarifying the relationship between the various human and technological components of the whole system in a way which also identifies the nature and purpose of the information interaction involved. An early user categorization (Codasyl 1979) shows three groups: direct, intermediate and indirect user modes. James Martin (1982) breaks down the direct category into three subgroups according to the nature and level of the computer programming activity:

1. non-programming end-users, who utilize the software of others to manipulate data
2. programming end-users, who write software for their own use
3. programming professionals, who write software for others

Rockart and Flannery (1983) go further and identify six categories of direct user. These categories include Martin's, plus three others which relate to the user's IS support role in the organization:

4. command-level end-users who manipulate software (but do not write programs) to control their outputs
5. functional support personnel, non-professional programmers who develop their skills to become de facto experts in their own functional area
6. end-user support personnel, whose role is similar to those of the programmers in 3 but who specialize in software for non-programmer users

These further categorizations are all useful in identifying methods of system control and in conceptually locating IS users among the various categories of support staff. The emphasis on the "direct" category by Rockart and Flannery and others reflects the technologist's natural preoccupation with the *interactive* mode of IS use. However, most *managers* are more likely to access most of their information through less direct modes, although this aspect has received less attention in the IS literature. A complete typology should locate the managerial information user among the most usual forms of interaction. This is the aim of the next section of this paper.

3. A NEW TYPOLOGY OF IS USE

The literature on managerial computing includes many references to IS "use" in the context of DSS and EIS. Although managers are often described as "users" of these systems, it is often not clear exactly what is meant. Does the manager himself interact with the system? Or does somebody else operate it and pass on information to him? Is the system user accessing information which is then passed on to someone else? Who is the operator and who is the information consumer?

This point is most important because the nature of the interaction itself is crucial. A fully interactive IS user has discretionary control over, and choice of, exactly how information is to be presented from moment to moment;

he sees and makes judgement and selects one path rather than another. On the other hand, the passive recipient accepts information which has been pre-digested to a large extent and may be based on another's selection and presentation. So the nature of the interaction, in terms of the *association* of the user with the IS, profoundly affects both the way in which the IS is used and also the value of the information contained. It is essential to be quite clear as to what *kind* of user we are considering.

That is far from being the whole story. Information is usually defined as data that is useful in current or prospective decisions; the *recipient* of the information is the key element in this definition (Feltham 1968). Thus the *purpose* of the IS user must be a key parameter in any definition or typology. *If the information is to be consumed directly by the user then this is a quite different situation from one where the information is transmitted onward for somebody else.* This point is not made clear in the earlier definitions and categorizations of end-users.

This paper is concerned with developing a straightforward typology of IS use which can be used to identify accurately the interaction between the user and the IS. The typology utilizes the two separate dimensions of *association* and *purpose* to show the main categories of interaction. Table 1 summarizes the two dimensions and identifies the nine categories of IS user which result; Table 2 lists the nine categories with a brief description of each, and Table 3 shows some examples of each category.

3.1 The Association Dimension

The first dimension may initially be considered as describing the user's *proximity* to the IS itself. The person who interactively controls the nature of the information coming from the system is clearly in a very different position from somebody who passively receives information whose creation has been defined and controlled by others. Generally, the nearer the user is to the source, the more control he has over the nature and extent of the information received. A scale can be constructed which shows interactive, hands-on IS users at one end and remote, hearsay information users at the other. In between, there are various intermediate positions. For example, observing a computer screen, or hearing voice output, is one mode of interaction which may not involve any *direct control* over the IS. Reading computer-created reports is slightly less direct and again involves no immediate control over the information. There are many other intermediate positions. The number of positions we select on this scale depends on how fine a gradation we are interested in.

So far, we have talked in terms of proximity of the user to the IS, but in fact it must include also the idea of *association* – i.e., the extent to which the user is *personally involved* with the IS. There are several aspects to the association: inputting data into the IS, receiving outputs from the IS, and controlling the function of the IS. These aspects could be used to elaborate the typology further, but for the sake of clarity this line of argument will not be pursued here. In general it makes sense to consider three broad user-association categories: direct, indirect and remote. (These are similar to the categories suggested by Codasyl [1979]). The three categories represent common modes of interaction among managerial IS users.

1. **Direct** – the user is in a hands-on relationship with the IS. This involves controlling inputs to the system, receiving the outputs and controlling the overall running of the IS. This category includes many computer users, for example the accountant who is analyzing data on a spreadsheet, the manager accessing personnel records, and the computer programmer updating a payroll system to cater for the latest tax changes. Within this category it is possible to distinguish different degrees of control; the user who manipulates software to achieve different kinds of output is clearly in a different position from the one who accesses fixed data sets using an elementary menu.

2. **Indirect** – the information user does not control directly the inputs or function of the IS. He receives output in the form of printed reports, or he views a screen, or in some other way accepts IS output indirectly. This is a very common mode of IS association; much of the standard information from organizational MIS is promulgated in this way.

3. **Remote** – here the information user has no association with the IS source but receives information even more indirectly, perhaps when it has been incorporated into other reports, or related by word of mouth. The information which the manager incorporates into his stock of knowledge about affairs in the organization may have come from a number of sources; it colors his thinking and shapes the way he acts. Others, in their turn, are influenced by the onward transmission of ideas as information is incorporated into the fabric of the organization's culture.

3.2 The Purpose Dimension

What is now required is a measure of the *purpose* which the IS user brings to his activity. A key aspect of the user's activity is his *intention*. A manager studying a list of low-stock items does so for a different reason than the professional computer operator who first handles the report. The manager may wish to make a decision on the basis of the stock data, or he may incorporate the data into his personal knowledge of the situation; either way, he acts on the information as it relates specifically to his functional role in the organization.

Table 1. A Behavioral Typology of Information System Use

The Association Dimension: How Close the User Is	The Purpose Dimension: How the Information is Used		
	A	B	C
1.	direct consumer	direct processor	direct transmitter
2.	indirect consumer	indirect processor	indirect transmitter
3.	remote consumer	remote processor	remote transmitter

Table 2. Nine Categories of Information System User

IS User Category	Description	
A1	direct consumer	• interactive user employs information in his own decisional role
B1	direct processor	• interactive user prepares/modifies information for another (but does not make decisions based upon it)
C1	direct transmitter	• interactive user passes information untouched to another
A2	indirect consumer	• receives information from a system controlled by another and employs the information in his own decisional role
B2	indirect processor	• receives information from a system controlled by another and prepares or modifies information for another
C2	indirect transmitter	• receives information from a system controlled by another and passes on information untouched to another
A3	remote consumer	• receives information indirectly via manual reports or word of mouth and employs the information in his own decisional role
B3	remote processor	• receives information indirectly and prepares/modifies information for another
C3	remote transmitter	• receives information indirectly and passes information on untouched to another

Table 3. Examples of Common IS Use

	Purpose Dimension		
Association Dimension	A Consumer	B Processor	C Transmitter
1. Direct	Manager in hands-on PC interaction	Staff analyst uses DSS	Computer operator
2. Indirect	Manager reviews computer reports	Accountant prepares information from computer reports	Document transmittal and filing personnel
3. Remote	Manager receives information second-hand	Financial analyst prepares information via second-hand sources	Stockbroker informs client of latest recommendations

The computer operator, on the other hand will not be interested in the *decisional content* of the information: he receives the information, he may scan it for errors or he may check control totals, but his purpose in handling it is completely different. The manager is the *data consumer*, the operator effectively transmits the data, but does not incorporate it into his own working role in the same way. It is useful therefore to consider a dimension which indicates the relationship of the information to the IS user's own work roles and needs. As with the first dimension, three categories are chosen to define the concept, although clearly many fine shades are possible.

A. Information for the user's own requirements

This category describes the *information consumers*: people who act directly on the information, or who incorporate it into their cognitive knowledge bases so that their subsequent behavior may be affected by the knowledge in some way. Most managers with line responsibilities will utilize their IS within this category for much of the time. Most DP professionals and staff personnel, on the other hand, will *not* require the informational content of IS outputs for decision-making purposes.

B. Information selected and modified

This category describes those whom might best be called *information* processors: people who receive information which they develop, digest, or act on in some way before transmitting it in some modified form to others. Many DP professionals and staff employees, including those from the OR/Management Science and Management Accounting disciplines, are engaged to some extent in activity which involves preparing information for others in this way. The final consumers of the information will be managers who act upon the information prepared for them by others.

C. Information transmitted

This category includes *information transmitters*: those involved in accessing information which is passed directly to others. Many people employed in IS departments act in this capacity; their work involves activity which produces information outputs which are conveyed directly to others.

4. MANAGERS AS IS USERS

When discussing user activities in IS it is essential to define the association dimension and the purpose dimension clearly. For example, many articles in the IS literature discuss DSS in terms of senior management use, but there is evidence (Martin 1988; Rockart and DeLong 1988) which shows that the top managers are often not themselves direct hands-on users. In fact several subtle relationships have grown up from the development of Decision Support Systems (DSS) and, more recently, Executive Information Systems (EIS). These systems are intended for the managerial information consumer and potentially they yield additional insights for the interactive managerial user because he can exercise discretion over which avenues to explore from the data and models offered to him by the system. This requires a category A1 user (i.e., a direct consumer) relationship with the IS (see Table 3). EIS in particular are aimed at senior managers who are prepared to act in the category A1 grouping.

At the same time, this category A1 relationship demands that the user invest a certain amount of time and effort in acquiring sufficient technical skills to enable him to drive the system to its fullest extent. Where these support systems are aimed at top management, the time investment of the manager must be offset against the informational benefits which are supposed to accrue. For many top managers, the skill investment may not appear worthwhile. Instead they rely on "chauffeured" access by technically skilled support staff (Culnan 1983). Thus we have a category B1 user (a direct processor) supporting a category A2 user (indirect consumer).

This mode of access prevents the full benefits of the system from accruing to the chauffeured manager, but it may represent a time- effective alternative for some. The most recent developments in EIS represent a substantial improvement in data accessing and presentation techniques (see Martin and Clarke 1989). These systems are therefore far more likely to be used interactively by the real information consumers. This may result in a shift of managers from category A2 or A3 users into category A1 user activity.

What are the implications of the current trends towards the increased importance of EUC in IS development, and towards the direct use of IS by decision-making managers? At present, most managers occupy the A3 or A2 positions on the typology matrix (see Tables 1 and 3): they consume information produced, assembled and transmitted by others. Senior managers are even more likely to occupy the A3 position, with staff personnel providing the first processing stage. This may well change in the future so that more managers occupy the A1 position for at least part of their information gathering activity, and thus exercise more direct control over their information sources. The result of this change could be a reduction in the importance of the intermediary roles occupied by personnel in the second (processor) column of the matrix.

5. CONCLUSIONS

Computerized information system use is a pervasive fact of organizational life. In order to progress understanding in fields where the interaction between user and information system is crucial, the essence of the relationship must be

made clear. The new two-dimensional user typology proposed in this paper provides an effective and cognitively appealing means of defining IS use and users. It helps conceptually in locating information-consuming managers among IS specialists and other categories of information user and is useful in clarifying the relationship between the user and the information source.

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7. ENDNOTE

1. This paper was accepted for presentation at the Conference prior to the death of C. J. Martin. The paper will be presented by Barbara Clarke, Department of Management Studies, Loughborough University, England.

APPROACHES TO STRATEGIC INFORMATION SYSTEMS PLANNING EXPERIENCE IN TWENTY-ONE UNITED KINGDOM COMPANIES

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1. INTRODUCTION

Strategic Information Systems Planning (SISP) has been reported to be the critical concern of IS Executives in large organizations. Several authors have suggested what SISP should comprise, how it should be done and what problems are typical. Researchers have begun to investigate the practice of SISP (Sullivan 1985; Lederer and Sethi 1988; Galliers 1987) and examine how firms can gain strategic advantage from information technology (Runge 1985; Ives and Vitale 1987).

A synthesis of these works would suggest that SISP is concerned with at least the following:

- aligning investment in IS with business goals
- exploiting IT for competitive advantage
- efficiently and effectively managing IS resources
- developing technology policies and architectures

In United Kingdom companies, these were the principal objectives recorded in interviews done for the study reported here (Earl 1989b). Lederer and Sethi (1988, p. 445) offered a definition of SISP, namely, "the process of deciding the objectives for organizational computing and identifying potential computer applications which the organization should implement." This is what Earl (1989a) distinguishes as Information Systems (as opposed to Information Technology or Information Management) strategy formulation and is the topic which the rest of this paper addresses.

2. METHODOLOGY

In 1988 and 1989 a two stage survey was done of large UK companies. First, case histories were conducted on the experience of six companies previously researched by the author. Second, 21 additional United Kingdom companies were investigated through field studies. All were large companies whose turnover ranged from £55bn to £100m, and they were either headquartered in the United Kingdom or possessed national or regional IS functions within MNCs headquartered elsewhere. They were drawn from the banking, insurance, transport, retailing, electronics, IT, automobile, aerospace, oil, chemical, services and food and drink sectors. Their experience of SISP ranged from one year to twenty years. The field survey, the stage reported here, comprised in-depth interviews with three "stakeholders" in each organization, 63 interviews in total. The IS Director or IS Strategic Planner was interviewed first, followed by the CEO or a general manager, and finally a senior line or user manager. All prior surveys on SISP known to the author questioned IS executives only, yet most authorities stress that SISP has to involve all three stakeholder sets. Other research has shown how user views and attitudes differ from those of IS specialists (Hedberg and Mumford 1975). Interviews were conducted from questionnaires to ensure completeness and replicability, but a mix of unstructured, semi-structured and structured interrogation was employed.

3. OUTCOMES OF SISP

All respondents reported organizational benefits from SISP and were able to select confidently from a structured list. Alignment of IS with business needs stood out as the primary benefit, 49 percent ranking it first and 78 percent ranking it in the top five benefits. Top management support, better priority setting, competitive advantage applications and top management involvement were the other prime benefits reported.

Respondents were also asked to evaluate their firm's *success* in SISP using a self-reporting scale from 1 (low) to 5 (high). They were given narrative translations of the scoring scale to assist them and to limit any tendency to self-report around the mean. Of the firms surveyed 9.5 percent claimed that their SISP had been "highly successful" deserving a score of 5, 58.7 percent reported that it had been "successful but there was room for improvement," scoring 4, and 28.6 percent said "it had been better than not doing it," scoring 3. Sixty eight percent of all respondents rated SISP worthwhile (scores 3 to 5) and 32 percent not so (scores 1 to 2). On this test, there were differences between stakeholder set; whereas 76 percent of IS Directors gave a score above 3, only 67 percent of general managers and 57 percent of user managers were so content. Alternatively, as the mean score by company was 3.73, and the modal company score 4, the typical experience can be described as worthwhile but with some room for improvement.

However, a complementary question revealed a different picture. Interviewees were asked in what ways SISP had been *unsuccessful*. Sixty five different types of unsuccess were recorded, but in such a long list none were dominant. Nevertheless, Table 1 summarizes the five most quoted reasons for dissatisfaction.

Table 1: Unsuccessful Features of SISP

Rank Order	Unsuccessful Feature
1	Resource Constraints
2	Not Implemented Fully
3	Lack of Top Management Acceptance
4	Length of Time Involved
5	Poor User-IS Relationships

It is apparent that concerns extend beyond the method of SISP. First, *implementation* was a cause of concern: IS strategies were not always implemented or fully achieved. They could be inadequately resourced or they hit organizational constraints. Whereas Lederer and Sethi (1988) found that most actual IS developments were not to be found on the IS strategic plan, there was interview evidence that much of what was proposed by SISP was not developed or implemented.

Another set of doubts concerned *process*. Issues such as management acceptance or "buy-in," poor user-IS relationships, user awareness, and line management non-participation are examples. There were also concerns over *method*. Such doubts included lack of strategic thinking, excessive internal focus, too much or too little attention to architecture, amount of time and resource required and ineffective resource allocation mechanisms.

Accordingly, the "unsuccess" factors were classified into three clusters of method, process and implementation issues. The results presented, in Table 2, do not show equal frequencies of citation, nor is the distribution grossly asymmetrical. When analyzed by stakeholder, interesting differences emerge (Table 3). Implementation is the highest concern of IS Directors – perhaps because they are charged with delivery – followed by method. User Managers report most concerns, especially about process, perhaps because they seek more influence. General Managers emphasize method issues, perhaps because they find strategy-making far from easy.

Table 2: Unsuccessful Features by Class

Concern Class	Frequency of Response	Percent
Method	50 citations	40
Process	41 citations	32
Implementation	36 citations	28

Table 3: Stakeholder Views of Unsuccessful SIP Features

	IS Directors		General Managers		User Managers	
	Citations	%	Citations	%	Citations	%
Method	14	36	18	44	13	28
Process	9	23	11	27	19	41
Implementation	16	41	12	29	14	31
Total	39	100	41	100	46	100

The data suggests that method, process and implementation are all necessary conditions for success in SISP. Indeed, when respondents volunteered success factors, based on their organization's experience, for SISP they conveyed such a multidimensional perspective (Table 4).The highest ranked factors of "top management involvement" and "top management support" can be seen as process factors, "available business strategy" and "study the business first" as more to do with method, and "good IS management" as at least partly related to implementation.

Table 4: Success Factors in SISP

Rank Order	Success Factor	Respondents Selecting	Primary Frequency	Sum of Ranks	Mean Rank
1	Top Management Involvement	42	15	160	2.54
2	Top Management Support	34	17	140	2.22
3	Business Strategy Available	26	9	99	1.57
4	Study Business before Technology	23	9	87	1.38
5	Good IS Management	17	1	41	0.65

Thus consultants, practitioners and researchers would seem well advised not to regard SISP as a matter of method alone. This is especially so if the impact of SISP methods is of interest, for typically it seems that firms use several methods over time. An average of 2.3 methods (both proprietary and in-house) had been employed by the 21 companies studied and nine of them had tried three or more. Any attempt to identify the effect of a method therefore becomes difficult. It also may be misleading because when asked to relate their firm's experience of SISP, respondents usually recounted a historiography of initiatives, events, crises, techniques, successes and failures all interwoven in a context of how IS resources had been managed.

Accordingly, this research shifted to an examination of SISP *approach*, that is of the interaction of method, process and implementation. The accounts of interviewees, the "untutored" responses to the semi-structured questions, the documents supplied and the tangents followed up by the interviewer all produced data on each company's approach. Once the salient features of SISP were compared across the 21 companies, five distinct approaches were identified. These seemingly could be used retrospectively to classify the experiences of the six case study firms.

4. SISP APPROACHES

The five approaches can be termed Business Led, Method Driven, Administrative, Technological, and Organizational and they are delineated as ideal types in Table 5.

Business Led approaches were adopted by four companies. The espoused emphasis is that the business will drive technology, not the reverse. This is seen initially as a simple matter whereby business plans or strategies are analyzed to identify where information systems are most required. Often this linkage is an annual endeavour and is the responsibility of the IS Director or IS strategic planner (or team). Eventually the IS strategic plan is presented to the board for questioning, approval and priority-setting.

Table 5: SISP Approaches

	BUSINESS LED	METHOD DRIVEN	ADMINISTRATIVE	TECHNOLOGICAL	ORGANIZATIONAL
EMPHASIS	the business	technique	resources	model	learning
BASIS	business support	best method	procedure	rigor	process
ENDS	plan	strategy	portfolio	architectures	themes
METHODS	ours	best	none	one way	anyway
NATURE	responsive	top down	bottom up	blueprints	interactive
INFLUENCER	IS planner	consultants	committees	method	teams
RELATION TO BUSINESS STRATEGY	fix points	derive	criteria	objectives	look at business
PRIORITIES	board	rational analysis	central committee	compromise	emerge
I.S. ROLE	driver	initiator	bureaucrat	architect	team member
METAPHOR	it's common sense	it's good for you	survival of the fittest	we nearly aborted it	partnership

General managers see this approach as simple, being "business-like" and a matter of common sense. IS Executives may see it as their most critical task and welcome it as just what IS has needed for years. However, they can discover that business strategies are neither clear nor detailed enough for specification of IS needs, so that interpretation and further analysis become necessary. In seeking clarification from the business, IS planners can find that top executives may be more forceful in their views and expectations than others. It may be especially difficult to promote the notion that IT itself may offer some new strategic options. User Managers can perceive the exercise as remote, complaining of inadequate involvement. Because the IS strategy becomes the product of the IS function, commitment of resources and users is not guaranteed, potentially impairing implementation.

Some advantages can accrue from this approach. Information systems are seen as a strategic matter and the IS function receives greater legitimacy. If the business strategy is clearly presented, the IS strategy can be well aligned. Indeed, in one of the case study companies which also adopted this approach, a clear business plan for survival initiated IS developments which are admired by many industry watchers.

Method Driven approaches were present in two companies (and probably two of the case study firms). The IS Director may believe that management will not think about IS needs and opportunities without the use of a formal method, perhaps applied by consultants. Any method will not do. There is a search for the *best method*, generally one better than the last one they tried.

Methods first adopted may find again that business strategies are deficient for the purpose of SISP, but they do not provide a remedy. As formal methods usually are sponsored by the IS department, they may fail to win the support and involvement of key managers. Thus, a second or third method may be attempted and perceptions of the "best" method emphasize the particular consultants as much as the technique. However, such consultancy exercises can be judged by user managers as "unreal" and "high level" and by top managers as "business strategy in disguise." A consequence is that the IS strategic plans lose credibility and may never be fully initiated.

Whether formal methods are bound to fail is not clear. A *succession* of methods achieved little in the two survey and two case study companies. Each method, however, was judged *ex post* to have been good in some unanticipated way for the business or the IS department, for example showing the need for business strategies or informing IS management about business imperatives.

The *Administrative approach*, which emphasizes resource planning, was found in five companies. Typically IS development proposals were submitted by business units or departments to committees or resource planners who examined project viability, common system possibilities and resource consequences. The outcome of the approach is a one-year or multi-year development portfolio of approved projects; typically no application is developed unless it is on the plan.

There were significant downsides to this approach freely discussed by respondents. It was commonly claimed that the outcome was not strategic. It was "bottom up" rather than "top down," ideas for radical change were not identified, strategic thinking was absent and enterprise level applications backgrounded. More emotional were the claims about conflicts, dramas and gamesplaying, perhaps inevitable in an essentially resource allocation procedure. The concern over resources led to a resource constrained outcome. Spending limits were applied *ex ante* (analogous with capital rationing in investment appraisal) and boards

and CEOs were accused of applying budget cuts as though only IS suffered.

There were also some potential benefits. Users had the opportunity to submit proposals up the hierarchy. An analysis of competitive advantage applications in the 21 companies showed user requests were the most common source of ideas. Second, the emphasis on viability, approval and resource planning produced portfolios that were implemented and produced good returns. Finally, the approach can be a good fit with companies adopting a financial control management style.

The *Technological approach* was adopted by four companies and possibly two of the case study companies. Here the emphasis was on deriving architectures or blueprints for IT and IS and often information engineering terminology was used. Data, computing, communications and applications architectures, with perhaps "integrated" case tools, might exist. A proprietary method would have been used or adapted in an in-house style. Both IS Directors and General Managers would emphasize the objectives of rigorous analysis and building an infrastructure.

In effort or investment terms, this approach could be the most demanding and it was high profile. All stakeholders would comment on the length of time involved in the analysis and/or implementation. User managers commented negatively on the complexity and the tendency for technical dependencies to displace business priorities.

These characteristics could lead to user revolutions or declining top management support. Thus smaller exercises followed producing partial, not enterprise-wide or cross-functional, architectures. The benefits became perceived as long-term and in one company no applications had been delivered after three and a half years. However, IS Directors would claim development of sound infrastructures and/or valuable analyses or models.

The *Organizational approach* was in use in six companies and one of the case study companies. The approach was not without method, but methods were employed as required and to fit the purpose. However, process was emphasized, especially management understanding and involvement. Sometimes a major SISP method had been applied in the past, but in retrospect it was seen to have been as much a process-enabler as an analytical investigation. For example, executive teamwork and an understanding of IS and strategy had been left behind rather than specific recommendations for IS investment. Indeed, organizational learning was evident in at least three ways.

First, IS development concentrated on only one or two themes growing in scope over several years as the organization began to appreciate the potential benefits. Second, studies were important in SISP and it was often the assignment of multidisciplinary senior executive project teams or full-time taskforces to tackle a business problem from which a major IS initiative emerged. The presence of an IS executive in the multidisciplinary team was felt to be important to the emergence of a strategic theme. Third, there was a focus on implementation, for example breaking themes down into identifiable and frequent delivery points and yet accepting occasional cost and time overruns to ensure eventual completion and incorporation of evolving ideas.

Disadvantages were also reported. IS Directors worried about how to regenerate themes, although one felt a theme would emerge in due course. They also perceived their IT infrastructures to be inferior due to incrementalism. Because this approach is essentially soft – there is no codified technique or procedure – a new CEO, management team or management style can erode it without the effect being apparent for some time. However, SISP had become a normal activity in these companies although it tended to be continuous and natural, not high profile and formal.

5. EVALUATION

The above descriptions are summarized as strengths and weaknesses in Table 6 and evaluated in Table 7 in terms of the three factors earlier suggested as necessary for success: method, process and implementation. In the Business Led approach, method scores low because there is none, process is rated low because it is commonly IS-dominated, but implementation is medium, because boards do approve some projects. In the Method Driven approach, method is high by definition, but process is largely ignored and implementation barely initiated. In the Administrative approach only a procedure exists as method, but its dependence on user submissions creates a medium process context. Because of its resource management emphasis, approved projects are implemented. The Technological approach is intensive of method, intolerant of process but usually leads to some implementation of infrastructure. The Organizational approach does not eschew method, invests in process and emphasizes implementation.

A more quantitative evaluation is an analysis of the propensity of each approach to generate competitive advantage applications. Respondents were asked to identify such applications and trace their histories. Although only 14 percent were identified as part of a formal SISP study, it is still interesting to compare achievement rates (Table 8). Possible reasons for this pattern are discussed elsewhere (Earl 1989b). Method Driven and Technological approaches are not promising, the former because little is ever initiated, the latter because competitiveness is not the focus. In the Administrative approach, user ideas receive a hearing; in the Business Led approach, some obvious necessities are actioned. In the Organizational approach, themes tend to be more radical and pursued for some time to give sustainable advantage.

Table 6: SISP Approaches: Strengths and Weaknesses

	Business Led	Method Driven	Administrative	Technological	Organizational
Strengths	Simple	Method	System viability	Rigor	Becomes normal
	Business first	Plugs strategy gap	System synergies	Infrastructure	Implementation
	Raises IS status	Raises strategy profile	User input	Integration	IS-User partnership
Weaknesses	Ad hoc method	User involvement	Non-strategic	Management support	Regeneration
	Management commitment	f(Method)	Bureaucratic	Partial implementation	Soft methodology
	f(Business Strategy)	Follow-up	Resource constrained	Complexity	Architecture

Table 7: SISP Approaches: Three Tests

	Business Led	Method Driven	Administrative	Technological	Organizational
METHOD	Low	High	Low	High	Medium
PROCESS	Low	Low	Medium	Low	High
IMPLEMENTATION	Medium	Low	High	Medium	High

Table 8: Competitive Advantage Analysis

Approach	Competitive Advantage Application Frequency
Business Led	4 applications per firm
Method Driven	1.5 applications per firm
Administrative	3.6 applications per firm
Technological	2.5 applications per firm
Organizational	4.8 applications per firm

Another means of evaluation is to correlate success scores with approach. Mean scores by each stakeholder and overall are shown in Table 9. No approach differs widely from the mean score (3.73) across all companies. However, the most intensive approach in terms of technique earns the highest score, perhaps because it represents what respondents thought an IS planning methodology should look like. Conversely, the Business Led approach, which eschews formal methodologies, earns the lowest scores. An alternative evaluation is to analyze the unsuccessful features so freely reported, assuming each carries equal weight. Table 10 presents this data according to class of unsuccess, namely method, process and implementation. Overall the Organizational approach has the least unsuccesses attributed to it. Furthermore it is not perceived to be the worst (or close to) on any of three classes of unsuccess. Conversely, Business Led has high unsuccess on method and implementation. Method Driven is perceived to be unsuccessful on method and process but opinion is less harsh on implementation, perhaps because implementation experience itself is low. The Administrative approach, as might be predicted, is not well regarded on method. Perhaps surprisingly, the Organizational approach raised doubts on process but the comments suggest a reflective self-critical perspective. This data is not widely divergent from the qualitative analysis in Table 7.

Table 9: Mean Success Scores by Approach

5 = high 1 = low	Business Led	Method Driven	Administrative	Technological	Organizational
Total means	3.25	3.83	3.6	4.0	3.94
IS Directors	3.5	4.5	3.6	4.25	4.0
General Managers	3.0	4.0	3.4	4.0	4.17
Line Managers	3.25	4.0	3.8	3.75	3.66

Table 10: Unsuccessful Features per Firm

Approach / Class	Business Led	Method Driven	Administrative	Technological	Organizational
Method	2.75	2.5	2.8	1.75	1.33
Process	0.75	3.0	1.6	2.5	2.16
Implementation	2.75	1.0	1.6	3.0	1.83
Total	6.25	6.5	6.0	7.25	5.32

Finally, although objectivity and quantification may be imputed to interpretative data and small samples, Table 11 seeks to present a multidimensional ranking on three of the criteria just analyzed – competitive advantage applications, success scores and unsuccessful features – once again assuming equal weight for each criterion. The Organiza-

tional approach stands out clearly as the most promising approach, with the remainder varying by criterion but not distinctive overall.

Table 11: Multidimensional Ranking of SISP Approaches

	Business Led	Method Driven	Adminis-trative	Techno-logical	Organiza-tional
Competitive advantage ranking	2	5	3	4	1
Success score ranking	5	3	4	1	2
Unsuccessful features ranking	2	3	4	5	1
Sum of ranks	9	11	11	10	4

6. CONCLUSIONS

SISP in large organizations is a complex phenomenon and has been pursuing, it seems, several objectives using more than one method over time. Companies report benefits but are cautious in claiming success. They are articulate on the unsuccessful features of SISP and are as concerned about process and implementation as method. Accordingly, rather than talk of SISP methods alone, a more holistic term, "approach," might be preferred. This can be seen to comprise a wide set of activities including studies, events, methods, daily organizational interactions, partnerships between IS departments and users, and occasional traumas, crises and accidents. Certainly these are the dimensions recounted by those who have participated in setting directions for IS.

Qualitative analysis reveals five SISP approaches in 21 United Kingdom companies. The experiences of the six prior case studies seemingly can be described within this taxonomy. The data suggest that a Business Led approach can sometimes be effective, but a Method Driven approach is likely to disappoint. An Administrative approach can yield some benefits, as can a Technological approach, but not those most sought from SISP, particularly applications which are judged to be strategic and management support respectively. On a multi-criteria evaluation, an approach which is "Organizational" seems likely to be most effective.

A novel aspect of this study is the analysis of general manager and user manager attitudes and experiences as well as those of IS Managers. In reporting back the "results" to participating companies, an interesting reaction has occurred. When asked to select which approach best describes their experience, if only IS professionals and planners are present their conclusions often differ from the author's interpretative results. When all three stakeholders are present, a lively discussion ensues but eventually, unprompted, the group's view coincides with the data and the author's interpretation. This suggests another test. Do differences in reported success score vary more by stakeholder set or by attributed approach? Analysis of variance tests suggest no significant association between either approach or stakeholder set and the fragile and perhaps irrelevant success score. Approach may be marginally more influential. The tests do suggest that approach has much the same effect on each stakeholder set are and the effects of each stakeholder set much the same for each approach.

Descriptively, however, differences in means and ends have been identified in each approach and the organizational approach looks most promising. This "result" does fit with some prior research. The thematic, emergent, interactive, both informal and formal, soft and in some ways – from the IS Manager's perspective – more political characteristics of the organizational approach are reminiscent of the more behavioral theories of organizational decision-making. In particular the dynamic is close to Mintzberg's (forthcoming) strategy as pattern or Quinn's (1980) incrementalist perspective on strategy-making. Indeed, both the strategies and the formulation process in the Organizational approach have a retrospective or rationalization character about them. The emphasis on implementation and distinct phases of benefit delivery is also reminiscent of Weick's (1984) strategic advance by small wins.

There is also some fit between the Organizational approach and the author's prior work on SISP methods (Earl 1987). The use of any method that helps at the right time may be consistent with earlier claims that multiple methods are required for IS strategic planning. However, the characteristics of the Organizational approach have no other obvious connections to prior SISP research. Furthermore, no contingent explanations are apparent for this approach or for the differences across all five. No significant association can be detected with organization structure, business size, business environment, IS intensity of sector or management style. Organizational approach firms did have several years' experience of SISP (a mean of 9.83 years) – which could suggest companies learn to plan by experience as suggested by Earl (1987) and corroborated by Galliers (1987) – but then so did other firms, especially those with an Administrative approach.

So what should practitioners conclude from this study? They could use the taxonomy of approaches as a diagnostic tool and consider how to remedy reported weaknesses and capitalize on claimed strengths of their particular approach. They could "mix and match" by adopting apparently desirable features of some approaches and avoiding obvious pitfalls of others. Alternatively, they could invest in the Organizational approach as that which seems best to cope with the three different challenges of strategic information systems planning discovered in this investigation.

For researchers, it is this multidimensional nature of SISP which is worthy of further study. Focussing on methods alone is not sufficient. Like strategy-making at large, SISP is a more complex phenomenon than simple technique and the characteristics of an effective approach may not fit easily with the certainty, rationality and structure often demanded by IS departments and their technologies.

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8. ENDNOTE

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