Prescriptions for Information Systems Planning in a Turbulent Environment

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Abstract

Observers have offered prescriptions for IS planning in a turbulent business environment. The action research described here examined actual IS planning practices in two real-world organizations in such an environment. One organization adhered closely to many of the planning prescriptions and the other did not. Their experiences support the view that the analysis of the external environment and a continuous planning process are essential in such an environment. More importantly, they suggest that, in a turbulent environment, comprehensive IS planning (i.e., adherence to many prescriptions) is more effective than less rigorous planning. Such a conclusion may seem counterintuitive. Although the experiences facilitate the development of new prescriptions, they impugn some of the others.

1. INTRODUCTION

Organizations must sometimes endure frequent and unpredictable environmental change. When they do, the level of such turbulence can dramatically affect both business planning and information systems planning (Ein-Dor and Segev 1978; Pyburn 1983; Vitale, Ives and Beath 1986; Bergeron, Buteau and Raymond 1991; Earl 1993). In such an environment, organizations need an IS planning process more than ever to help them choose the most appropriate information systems and successfully manage their implementation.

Environmental turbulence refers to “the frequency and unpredictability of changes in stakeholder expectations” (Sambamurthy, Zmud, and Byrd 1994). In a turbulent environment, the expectations of customers, suppliers, competitors, and governments change rapidly and unpredictably (Lederer and Mendelow 1990; Raghunathan and Raghunathan 1991; Sambamurthy, Zmud and Byrd 1994). In response, organizations revise their business plans. They also re-evaluate their existing IS plans and successfully manage their implementation.

Environmental turbulence increases the risk of IS investment failure. Without appropriate planning, organizations may fail to realize the anticipated benefits of their IS investments (Clemons and Weber 1990). Changes in business direction and the resulting changes in IS project priorities may lead to excessive delays in the execution of IS investments (Lederer and Mendelow 1990). Users may lose interest in a system designed to satisfy their old needs and then drop their support (Lederer and Mendelow 1993).
This paper examines several key prescriptions for IS planning in a turbulent environment. The prescriptions are then considered on the basis of action research in a turbulent environment in one organization that successfully implemented a specific IS and one that did not. The research provides contributions to our understanding of IS planning in a turbulent environment.

2. IS PLANNING PRESCRIPTIONS IN A TURBULENT ENVIRONMENT

IS planning is the process of identifying the computer-based applications that will assist an organization in executing its business plans and realizing its business goals (Lederer and Sethi 1988). IS planning is concerned with the sequencing and implementation of IS applications, as well as the examination of existing and proposed IS applications (Sambamurthy, Zmud and Byrd 1994). Although it is complex and its effectiveness is difficult to assess, one way to assess it is via the success or failure of its recommendations (Fitzgerald 1993). Thus, its resulting plan must be rigid enough to permit the completion of large projects yet flexible enough to adjust to environmental change (Lederer and Mendelow 1993).

In general, a turbulent environment requires more flexibility in an organization’s strategies and use of information technology (Knoll and Jarvenpaa 1994). A flexible organization should be able to (1) effect intentional changes, (2) continuously respond to unanticipated changes, and (3) adjust to the unexpected consequences of predictable changes (Bahrami 1992). To do so in IS planning, researchers have suggested several prescriptions, particularly for a turbulent environment. Table 1 summarizes them. Because they resulted from an extensive literature search, they probably represent the essence of contemporary prescriptive knowledge about IS planning in such an environment.

The prescriptions have been deemed necessary because a turbulent environment increases the complexity of business analyses. In such an environment, business plans are not necessarily available or may be too general to provide a basis for IS planning (Ein-Dor and Segev 1978; Lederer and Mendelow 1986). Furthermore, senior management may choose to make intuitive decisions which conflict with the existing formal plans (Lederer and Mendelow 1987; Steiner 1972).

Consequently, in business sectors undergoing great change, specific emphasis on external analyses has been prescribed (Earl 1988; Bergeron, Buteau and Raymond 1991). IS planners are advised to incorporate a number of alternative “futures” or scenarios rather than rely on one particular future (Galliers 1987; Henderson, Rockart and Sifonis 1984; Earl 1988). Such planners have thus been further warned to “seriously recognize the need to evolve from one planning perspective to another based on the shifts in the business environment - both internal and external” (Venkatraman, Henderson, and Oldach 1993, p. 147).

The notion of such alternative futures means that the nature of decision making changes. Instead of trying to identify optimal solutions with respect to predefined goals, planners are told to try to create satisfactory alignments of environmental opportunities and risks on the one hand with an organization’s IS resources and capabilities on the other (Vitale, Ives, and Beath 1986; Miles and Cameron, 1982). For each IS investment proposal, IS planners should analyze the uncontrollable variables (e.g., extra-organizational situations) and the partially controllable variables (e.g., organizational resources) in relation to the feasibility of the investment (Ein-Dor and Segev 1978).

Environmental turbulence thus changes the way the planning process should be organized. The process should not be blind to important organizational or environmental events. Thus, formal schedules and meetings may prove difficult to use despite their desirability. An informal network of planners may often help them capitalize on unexpected opportunities (Boynton and Zmud 1987; Vitale, Ives and Beath 1986).

Finally, in a turbulent environment, the role of plans in the implementation phase changes. The resulting plans should not be considered as blueprints for the future (McLean and Soden 1977). Instead, they should be formulated and used as a flexible framework within which unpredicted changes can be managed in an orderly and consistent manner (McFarlan 1971; Galliers 1987). Moreover, periodic reviews of the process of planning and implementing information systems are recommended to allow continuous change and adaptation to environmental opportunities and risks (Galliers 1987).
Table 1. IS Planning Prescriptions for a Turbulent Environment

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1</td>
<td>Organizations should use multiple analysis perspectives and include the assessment of the competitive environment (Earl 1988; Raghunathan and Raghunathan 1991; Bergeron, Buteau and Raymond 1991).</td>
</tr>
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<td>2</td>
<td>The analysis should incorporate a number of alternative futures and scenarios rather than relying on one particular future (Galliers 1987; Earl 1988).</td>
</tr>
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<td>3</td>
<td>Instead of optimizing against predefined goals, IS planners should seek satisfactory alignments of environmental opportunities and the organization’s IS resources (Vitale, Ives and Beath 1986; Miles and Cameron 1982).</td>
</tr>
<tr>
<td>4</td>
<td>The feasibility of each IS project proposal should be analyzed with respect to uncontrollable variables (Ein-Dor and Segev 1978).</td>
</tr>
<tr>
<td>5</td>
<td>To ensure continuity of planning effort during budget stringency, the IS planning process should be made cost-efficient (McFarlan 1971; King 1988).</td>
</tr>
<tr>
<td>6</td>
<td>The IS planning process should allow for delays and the flexible timing of IS decisions (Boynton and Zmud 1987; Ein-Dor and Segev 1978).</td>
</tr>
<tr>
<td>7</td>
<td>IS planning should be based on an informal network of planners (Boynton and Zmud 1987; Vitale, Ives and Beath 1986).</td>
</tr>
<tr>
<td>8</td>
<td>IS planning should provide a flexible framework within which implications of changed circumstances can easily be identified and managed (McFarlan 1971; Galliers 1987).</td>
</tr>
<tr>
<td>9</td>
<td>A continual review of the implementation of plans is needed, since business objectives and information requirements are temporal in nature (Galliers 1987).</td>
</tr>
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</table>

While comprehensive planning (i.e., following all or most of them) has merit, it has been suggested that less comprehensive planning may have even more merit in a turbulent environment (Fredrickson 1984; Fredrickson and Mitchell 1984). This is because change in such an environment may be so rapid that plans are obsolete before they can be followed (Lederer and Mendelow 1990). Thus, the planning process is susceptible to wasted efforts, misdirected investments, and low morale (Vitale, Ives and Beath 1986). When the business environment is volatile, the comprehensive planning approaches simply may not provide the necessary flexibility to be effective (Pyburn 1983). In effect, a less comprehensive approach with continuous adaptation to the availability of resources in the presence of environmental threats and opportunities may prove more useful (Vitale, Ives and Beath 1986).

3. RESEARCH METHODOLOGY

Action research was the investigative methodology in this study. It “aims to contribute both to the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework” (Rapoport 1970, p. 499). This twofold view of the objectives of action research — to solve a problem for a client and to advance science — is, perhaps, the most fundamental feature in action research (Lewin 1946; Clark 1972; Susman and Evered 1978; Argyris 1982; Benbasat, Goldstein and Mead 1987; Argyris, Putnam and McLain Smith 1987; Checkland 1991; Jönsson 1991; Gummesson 1988; Reponen 1992).

Action research was selected because of the in-depth and first hand understanding that the researcher can obtain from organizational change processes and strategies (Benbasat, Goldstein and Mead 1987; Reponen 1992). Furthermore, action research provides an opportunity to learn about practice and alternative ways of carrying it out (Argyris, Putnam and McLain 1987; Argyris 1982; Susman and Evered 1978; Checkland 1991; Jönsson 1991; Gummesson 1988; Reponen 1992).
IS Planning in a Turbulent Environment

Smith 1987; Wood-Harper 1992). Hence, action research has been used in developing IS planning and implementation approaches such as ETHICS (Mumford 1979), Soft Systems Methodology (Checkland 1991), Action Modelling (Fitzgerald 1991), Multiview (Wood-Harper 1992), and Evolutionary Model for Information Systems Strategy (Reponen 1993).

The senior author participated as an external advisor in two IS projects during 1988 and 1992 (Ruohonen and Salmela 1992; Salmela and Ruohonen 1992; Salmela 1993). In each case, the client organization faced a decision whether or not to proceed with an IS project. The role of the senior author was to interview users and managers and to write a report to assist in making the decision. Personal involvement in the planning process allowed data collection through direct observations, interviews, and the review of company documents. Thus, the researcher had the two major action research objectives: to assist in solving a planning problem in the client organization and to contribute to the ongoing development of prescriptions for IS planning. After the initial planning process, the researcher monitored environmental changes and the success of the project.

The IS planning process was seen as responsible for building the awareness, commitment, and skills needed to cope with the changing organizational environment. Adherence to IS planning prescriptions was expected to alleviate the problems that otherwise might occur as a result of unpredicted environmental changes. A failure to adhere to prescriptions during the IS planning process, on the other hand, was expected to make adaptation to changes more difficult. The review of external and organizational changes during project implementation was made mainly through secondary data, such as annual reports, newspaper articles, and industry statistics.

The implications of the environmental changes on the project implementation and systems success were reviewed longitudinally. Data were collected via personal visits to the research sites, telephone interviews, and conversations. The last contacts with the client organizations were in the fall 1995, four to seven years after the initial project decisions.

4. THE INVESTPLAN FAILURE

A major construction materials supplier in Scandinavia and Northern Europe expanded its operations in the late 1970s. Formal means of communication began replacing informal channels. By 1990, it had a comprehensive IS for budget planning and control.

Its corporate financial controller was satisfied with existing corporate reporting systems. However, the information provided by divisions and strategic business units did not describe major investment proposals or the progress of investments in execution. He and some of the five division controllers considered this a weakness. The controllers expressed dissatisfaction about the ambiguity of investment proposal evaluation and selection.

However, other controllers felt that a new IS with more clearly defined investment practices was unnecessary. No one had clearly explained the benefits of the automation of investment reporting. Some managers saw a proposed IS as a finance department attempt to increase its power over the divisions.

These conflicting views convinced the corporate financial controller to obtain an outsider’s independent view. Thus, the IS planning process started as a joint effort of the company and a leading Finnish business school. The senior author served as a consultant and began by interviewing the division controllers.

4.1 The Planning Process

IS planning for the project was fairly casual. The project was selected individually, outside any organizational planning processes. The decision was largely based on informal discussions and the experience and intuition of the corporate financial controller and the division controllers, rather than on comprehensive rational analyses with formal criteria. In retrospect, the corporate financial controller described the rationale behind the approach by stating:
We had an immediate problem and we wanted a solution to it. The company was investing huge sums of money and we needed tools for the planning and control of the investments. We didn’t want to waste time by conducting detailed analyses or by going through a multi-stage, formal approval process. The use of a light and efficient planning process was a conscious and deliberate choice.

Interviews with the division controllers took place in October, 1988. They were asked three major questions: (1) What are the existing procedures for investment planning? (2) What are the existing procedures for investment follow-up? (3) Can an IS be used to support these procedures? The interviews did not cover external issues and risks. Instead, the objective was merely to describe the existing procedures for investment management in different divisions.

The resulting report argued the need to develop investment management practices on the basis of past changes in the organization: growth, internationalization, and decentralization. The report was predicated on the single view that these trends would continue and would require the decentralization of investment decisions and normalization of investment reporting to maintain control. The decision to develop investment planning and control procedures with a system called Investplan was then made in a fairly informal controllers’ meeting in November, 1988.

Thus, many important planning prescriptions for a turbulent environment were ignored. The Investplan column in Table 2 indicates those that were and were not followed. (Table 2 first lists the prescriptions ignored by Investplan but followed by the case discussed below. It then shows those followed by Investplan but ignored by the other case. It next identifies those followed by both. Finally it lists those followed by neither. Prescriptions #10, #11, and #12 are included in the table because they were used by the case discussed below; they are elucidated below.)

### Table 2. Adherence to Planning Prescriptions in the Cases

<table>
<thead>
<tr>
<th>Prescriptions</th>
<th>Investplan</th>
<th>WIS+/CIS</th>
</tr>
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<tbody>
<tr>
<td>1 Organizations should use multiple analysis perspectives and include the assessment of the competitive environment</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>2 The analysis should incorporate a number of alternative futures and scenarios rather than relying on one particular future</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>3 Instead of optimizing against predefined goals, IS planners should seek satisfactory alignments of environmental opportunities and the organization’s IS resources</td>
<td>No</td>
<td>Yes</td>
</tr>
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<td>8 IS planning should provide a flexible framework within which implications of changed circumstances can easily be identified and managed</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>9 A continual review of the implementation of plans is needed, since business objectives and information requirements are temporal in nature</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>10 The process should involve people from different organizational levels</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>11 The process should ensure organizational support for IS decisions</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>12 Key coalitions must be regularly tapped to garner input into and support for the plan</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>5 To ensure continuity of planning effort during budget stringency, the IS planning process should be made cost-efficient</td>
<td>Yes</td>
<td>No</td>
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<td>No</td>
</tr>
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<td>7 IS planning should be based on an informal network of planners</td>
<td>Yes</td>
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<td>4 The feasibility of each IS project proposal should be analyzed with respect to uncontrollable variables</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
4.2 Environmental Changes During the Project

Soon after the initial system tests in the fall of 1990, the signs of a general recession appeared. The level of investments in all divisions began to decrease considerably. In all of Scandinavia, the construction industry suffered seriously. Finnish markets plunged by over 50% from 1990 to 1993.

This dramatic change failed to provide the expected growth and internationalization. The new environment provided little need for IS support of investment planning. Thus, management had little motivation to proceed with Investplan and temporarily delayed the project. Later, it was canceled.

4.3 Adequacy of the Planning Process

The planning of Investplan had been inadequate because management had misunderstood its business problem. During project planning, the corporate financial controller had been concerned that the information provided by divisions and strategic business units did not describe major investment proposals or the progress of investments in execution. The underlying problem was not the absence of this information but instead was the poor assessment of investment risk due to inadequate investment planning support systems. Hence, when the environment became turbulent, the organization was very vulnerable and suffered excessive financial losses. Later, the corporate financial controller described this major IS planning error by stating:

> We should have emphasized more the business side of the problem. We analyzed it too much as a problem in our financial reporting systems. Had we better understood the significance of the project for our business, we would certainly have organized it in a different way.

In other words, had Investplan’s planning functions been operational in 1989 and 1990, the firm would quite likely have avoided many poor investments and fared considerably better during the turbulent years.

Had the feasibility analysis of the Investplan project been more thorough and incorporated a more pessimistic market scenario, the risks in continuing with lax investment planning support would have become more apparent. This scenario then could have led to a more expeditious implementation of Investplan.

The absence of periodic planning review meetings during project development made it difficult to assess the forthcoming impact of the environmental turbulence on Investplan. No one envisioned a corporation without investments. Thus, no attempts were made to revise the plans when the environment turned sour.

The experiences in this project also suggest that coalition building in IS planning may increase in importance in a turbulent environment. The corporate financial controller stated that communicating the project’s significance to senior and division management should have been emphasized.

Thus, the project should have been executed faster and with more management attention. The planning process should have identified and promoted a wider recognition of the significance of the project. This would have been achieved if more emphasis had been placed on critical business analyses and organizational communication during IS planning.

5. THE WORKPLACE IS SUCCESS

The National Board for Labour Protection (NBLP; also referred to as the central administration) was a large public sector organization that supervised occupational safety in all Finnish organizations and workplaces. Although the actual inspection work was done by inspectors in fourteen regional offices, the NBLP was responsible for labor protection (LP) activities on the national level.
The managers in the NBLP were well aware of the difficulties in using their Workplace Information System (WIS). The regional inspectors spent huge efforts keying inspection reports into its database but no one knew how to use this database very well. The maintenance of the WIS was expensive for the NBLP. Thus, both the regions and the NBLP agreed to enhance it.

However, they disagreed on the objectives of an improved WIS. NBLP managers wanted improved performance evaluation and reporting. The regions wanted a new WIS to help in inspections. In fact, the difficulties in improving the WIS reflected a more general political tension between the regions and NBLP. With the organization’s growth during the 1980s, the regions and NBLP had become more distant.

To get a more balanced view of NBLP and regional needs, NBLP managers sought external consultants. In August of 1990, they contracted with a leading Finnish business school to conduct interviews in the NBLP and two regions.

5.1 The Planning Process

The IS planning process embodied many desirable features. For example, the project had been officially approved in various planning cycles. It was a top priority in the IS strategy appendix of the 1990-1995 NBLP’s Medium Range Plan. It was also one of the most important projects in the 1990 IS plan.

A committee had been named to analyze the need for the new WIS and suggest guidelines for its development. The chair and secretary of the committee were from the NBLP. Its four other members represented different regions. An exact date was set for the committee to complete a proposal for WIS development.

The role of the researcher was to assist the committee. In the NBLP, he interviewed three heads of different divisions. In the regions, he interviewed six managers and inspectors.

The analyses during the WIS planning process were comprehensive. Trends in the external environment were a key issue. The final report emphasized external changes and their implications for LP in general and the WIS in particular. It identified three main external trends. First, attitudes and expectations toward LP in companies were changing. Second, new ergonomic and psychological problem areas were emerging in LP. Finally, the NBLP faced increased cost effectiveness demands due to the recession and government budget constraints.

The new functions in the WIS were carefully related to organizational changes, such as increased planning of LP activities, adoption of new, cost effective methods to influence companies, increased utilization of projects, and a more consultative approach to LP problems. Thus, WIS development was seen as a way to help the organization adapt to changing external expectations. In this sense, the proposal for WIS development was a model for managing change.

The WIS committee’s report in April, 1991, said that an “extended WIS” or “WIS+” would be developed as a temporary solution so that a working IS was always available. Also, a new Control Information System (CIS) would replace the current WIS.

This plan provided a flexible framework for future decision making. Although it said very little about the exact WIS development process or the new functions, it listed various contingency factors and the general way planning should proceed. It also emphasized that CIS development be integrated with the development of other regional information systems. Furthermore, it said that the final CIS design could be determined only after more experience with ongoing development projects.

Although the CIS plan was fairly general, it precisely described how the CIS project would be organized and scheduled. Thus, it was important by making a clear organizational commitment to the ongoing planning of the CIS.

In summary, the WIS+/CIS project used many important planning prescriptions for a turbulent environment. The WIS+/CIS column in Table 2 shows those that were and were not followed.
5.2 Environmental Changes During the IS Project

NBLP implemented the temporary extensions to the WIS in 1991. In essence, some new fields were added to the old screens and reports. The changes permitted the WIS+ to support some new activities.

During the period 1991 to 1993, inspection work was difficult. The government budget crisis showed no sign of improvement. Government cost savings did not cover the budget deficit created by unemployment fees, bank support, and the decreasing tax income. The need for even more radical cost cutting in government agencies continued.

Concerns grew not merely about cost reductions but also about the need for LP itself. Rumors circulated about the future of the NBLP and the regions and created uncertainty and job insecurity.

A major organizational change took place in March, 1993, when the NBLP merged into Ministry of Labour. NBLP’s status decreased from being an independent national board to a Ministry department. The NBLP’s diminished importance meant more independence for the regions.

Interestingly, the major changes in the organization and its environment did not deter the CIS planning efforts. Instead, the members of the former WIS+ committee continued in a newly formed CIS committee. The CIS replaced the WIS+ in the beginning of 1995 and thus the project met its original deadline. Furthermore, updates were implemented at year end.

The regions saw the project as a success because new features supported inspection. The NBLP saw the system as a success because it resulted in direct savings in operating and maintenance costs. The head of the development committee affirmed this by stating: “Because of CIS we are saving millions (of FIMs) each year in EDP service costs.”

5.3 Evaluation of the Adequacy of the IS Planning Process

The planning of WIS+/CIS apparently was adequate in building the awareness, commitment, and skills needed to cope with the turbulent environment. The comprehensive approach to planning seemed to protect the project from the impact of the unpredicted environmental change. The CIS was implemented despite the major changes in the environment.

The IS planning used in the project has many limits and drawbacks. It is very slow and often produces more investigative reports, documents, and plans than decisions or actions. Progress is also vulnerable to organizational politics.

However, in terms of coping with a turbulent environment, such a process seems to have had many advantages. In the project, the analyses were thorough and covered external environmental trends. Planning was not based on a single view of the future, but the plans were formulated as frameworks for managing change. The formal planning process placed a premium on ensuring continuity and informal communication within the committees that supported it.

Perhaps most noteworthy in the planning was the democratic decision making and coalition building to support IS decisions. The project had been approved in several organization level planning cycles. The committee had members from both the regions and the NBLP. An explicit objective in the planning process was to seek compromise solutions between the NBLP and regions. All decisions had consensus. In fact, the committee chair considered the democratic nature of the planning process as the major reason why organizational changes had little impact on the project.

In general, neither the regions nor the NBLP were fully satisfied with the progress in the project. Both sides were aware, however, that the best that could be achieved was a compromise between conflicting views. The democratic planning process was deemed to lead eventually to such a compromise. This appeared to be of crucial importance in coping with the turbulent environment.
6. CASE STUDY COMPARISON SUMMARY

This research began by identifying a set of IS planning prescriptions presumed to offer an ideal approach in a turbulent environment. The set appeared in Table 1. Actual practices from two projects as observed in action research appeared in Table 2. In general, the second project (WIS+/CIS) followed the prescriptions more closely. It followed five of the nine prescriptions from Table 1 which the first project (Investplan) ignored.

The second project followed three additional important practices. Table 2 shows these as #10, #11, and #12. All three deal with the involvement of users and managers and thus overlap somewhat. However, they differ sufficiently to merit mention. More importantly, the literature has not explicitly discussed them.

WIS+/CIS was implemented and successfully used whereas Investplan was never even implemented. The authors attribute this success to its adherence to the prescriptions. They attribute the failure of Investplan to its failure to adhere to them.

7. CONTRIBUTIONS OF THE RESEARCH

The contribution of any research is constrained by its approach. In this study, the researcher witnessed behavior illustrating how the organizations followed particular prescriptions. Moreover, the researcher was sufficiently familiar with the planning processes in both organizations to know that the other prescriptions were not followed. Nevertheless, the case study data is open to differing interpretations on the basis of subjective judgments. That is, other observers might draw different conclusions. In fact, while this research focused on IS planners, other researchers might consider other stakeholders and draw different conclusions. They might use a much larger number of subject organizations to obtain a broader picture of the use and influence of each prescription. They might also examine whether other extraneous variables (such as differences in industry) played a role in the findings. In effect, any case research analysis can only suggest insights, argue their validity, look for support from other work, and recognize the tentative nature of the ideas.

In light of that, the experiences with Investplan and WIS+/CIS make an important contribution by generally corroborating the value of comprehensive IS planning in a turbulent environment. The first five rows in Table 2 illustrate this by showing the original prescriptions from Table 1 that the successful WIS+/CIS project followed but the unsuccessful Investplan project failed to follow. These particular prescriptions emphasize the importance of multiple analysis perspectives (prescription #1) with alternative futures and scenarios (#2) and a continuous review of plans (#9). They also stress the importance of a flexible framework to respond to change during the review (#8). Finally, the alignment of risks and resources (#3) appeared to distinguish success from failure. Perhaps taken together, they signify the importance of controlled flexibility during IS planning in a turbulent environment.

In addition to corroborating five original prescriptions, the experiences with the projects suggested three more. These appear in the subsequent rows in Table 2. That is, WIS+/CIS involved employees from different organizational levels (#10), ensured organizational support (#11), and tapped key coalitions regularly (#12) whereas Investplan did not. These prescriptions illustrate the democratic nature of the former project. Although they are consistent with the “organizational approach” to IS planning (Earl 1993) and with collaborative general management approaches (Ciborra 1994; Alter and Hage 1993), the extensive literature review of IS planning in a turbulent environment had not identified them explicitly. Thus, they are presumed to be new prescriptions and they represent important contributions to the understanding of such planning. Perhaps taken together, they signify the importance of a democratic foundation to IS planning in a turbulent environment.

While the success of these eight prescriptions makes some sense, at the same time it may also strike some readers as counterintuitive. This is because (as suggested much earlier) change in a turbulent environment can be so rapid that (1) plans are obsolete before they can be followed, (2) planning flexibility is impossible, and (3) wasted efforts, misdirected investments, and low morale proliferate. Such adverse outcomes did not occur in WIS+/CIS, thus affirming comprehensive planning despite the turbulence of the environment.
Although eight prescriptions presaged success, not all prescriptions were affirmed. The IS planning process of the failed Investplan project was concerned with cost-efficiency (#5) as well as flexible timing (#6) whereas that of WIS+/CIS was not. Adherence to the former prescription probably detracted from the quality of the Investplan analysis. Adherence to the latter likely enabled Investplan to miss the opportunities in 1989 and 1990 which a tighter schedule would have prevented.

These deductions may be surprising but perhaps Investplan simply emphasized cost efficiency and flexible timing too much. In other words, following IS planning prescriptions too diligently may produce diminishing returns or even adverse consequences. Because too much IS planning may be detrimental, the prescriptions appear more complex than they have typically been viewed.

Both projects employed an informal network of planners (#7). Doing so did not guarantee their success. Neither analyzed project feasibility using uncontrollable variables (#4). Failure to follow that prescription did not guarantee their failure. These observations suggest that future research might attempt to consider organizations that differed in the use of these prescriptions to demonstrate any possible different effects.

Regardless, this research found that more comprehensive planning facilitated success in a turbulent environment whereas less comprehensive planning did not. The painful meticulousness of multiple scenario analysis and consensus building in the comprehensive IS process was worth the necessary time and labor. Environmental change may have been rapid but it did not render IS plans obsolete before they could be followed. Planning may have produced some employee objection, but the flexibility of the final plan and consensus behind it justified the effort.

8. REFERENCES


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