



Dynamic and emergent information systems strategy formulation and implementation

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Abstract

Early attempts to formulate information systems (IS) strategies concentrated on the analytical task of deriving IS strategies from business plans. The limitations of the static plans that often resulted from these formal studies were, however, soon discovered. The critics suggested informal and incremental planning to ensure flexibility, creativity and strategic thinking to comprise emergent strategies as well as planned strategies.

In previous IS planning research, there appears to be a contradiction between the published planning methods and the generally held views about effective implementation of IS planning process. The explicit methods described in IS literature predominantly assume a comprehensive IS planning process. Despite the fact that many researchers consider incremental approaches to be more effective, methods that can be used to facilitate incremental IS planning are few, not detailed enough and not comprehensive.

The four cycles method introduced in this paper attempts to combine the strengths of both the comprehensive and incremental planning to be able to recognise emerging trends and to make an e-business strategy. The method provides a basic schedule for organising planning activities. IS planning is seen as a continuous process that is periodically adjusted to the expectations of the participating managers. Practising managers can use the method to facilitate implementation of an incremental and continuous IS planning process. For e-business strategy research, the paper provides a theoretically based method that can be tested in future action research projects.

The first results of conducted action research show that the method should not be used as a checklist but as a choice list. Each period had a constant focus on external developments and the fit with internal possibilities. The method provided a flexible and dynamic basis for actions. The emergent nature of the changes and the difficulty of formalising creativity and innovation placed restrictions on the planning process. We learned that a thematic approach where each cycle is given a creative subject helped to “open up” the users in the organisation. Future research should focus on the inter-organisational nature of

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e-business strategy. If it is difficult to get top management participation, it will be even more difficult with more organisations involved.

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Keywords: Information systems strategy; Corporate strategy; E-business strategy; Strategic thinking

1. Introduction

The challenge of aligning information systems (IS) decisions with business needs was discovered already in the early 1980s. For almost a decade, strategic IS planning was ranked on the top of the listings of critical issues in IS management (Niederman, Brancheau, & Wetherbe, 1991). Chan, Huff, Barclay, and Copeland (1997) and Segars and Grover (1998) show that it has not been out of the agenda since. Teo and Ang (2001) studied 138 firms and concluded that there are still many problems to be solved. The problems in launching and developing the IS strategy can be partly solved by using a comprehensive method, the problems in using the strategic plan have to be solved incrementally and that is why we propose a combined strategy.

Most of the formal methods for formulating strategic IS plans were published in late 1980s and early 1990s. While these methods provide clear steps for planning a new IS strategy, the risks associated with large special studies were also soon discovered. Thus, researchers started investigating more dynamic and incremental approaches to IS strategy formulation (Earl, 1993; Ciborra, 1994). In these approaches, explicit planning methods are seen as having only a minor role. The process is informal and rests very much on the ability of key managers to include the right people and conduct the right analyses.

With the advent of new technologies, such as Internet, the challenge of aligning IS with business is perhaps more significant and more difficult than ever. Even if the new strategies are now named e-business strategies (Hooft & Stegwee, 2001; Hackbarth & Kettinger, 2000), the basic tasks in planning are still the same: developing strategic vision, governing the projects, allocating resources, planning the infrastructure and ensuring management commitment (Earl, 2000; Venkatraman, 2000).

This paper is based on a view that the early strategic IS planning methods are too static for formulating IS strategies in the new age. On the other hand, given the complexity of issues in the planning agenda and the broad (inter) organisational implications that the new web-based systems often have, relying on a totally informal and incremental planning process involves risks as well. The objective of the four cycles method is to promote continuous planning that involves sufficient degree of formalism to ensure that all critical areas of IS planning are addressed periodically.

The paper begins with an introduction to IS strategy planning and its objectives and describes both formal and informal ways of carrying it out. It then continues to describe the four cycles method to IS strategy planning. For each cycle, relevant prescriptions, tools and outcomes are drawn from e-business planning, strategic IS planning and strategic management literature. At the end of the paper, the contributions for research and practice are discussed.

2. Objectives for information systems strategy planning

A key outcome of IS strategy planning is a portfolio of IS that will assist an organisation in executing its business plans and realising its business goals (Lederer & Sethi, 1988). Organisations thus conduct IS planning to identify the most valuable IS projects. They seek applications that provide higher payback (Galliers, 1987), strategic significance (Choe, Lee, & Park, 1998) and congruence with the organisation's competitive needs (Galliers, 1987; Segars & Grover, 1998). Uncertainty has become a way of life. Companies are finding it ever more difficult to predict changes in their environments (Luftman, 1996), which also increases the risk of IS investment failure (Salmela, Lederer, & Reponen, 1996, 2000).

IS planning is also concerned with the implementation of these IS (Sambamurthy, Venkatraman, & DeScantis, 1993; Gottschalk, 1999). An important objective in IS planning is to ensure senior management commitment for implementing the selected projects and to create a partnership between IS and user groups for successful implementation efforts (McLean & Soden, 1977; Segars & Grover, 1998; Teo & Ang, 2001). In addition, IS planning forecasts resource and skill requirements and defines improvements in the IT infrastructure and IS organisation to support both existing and future IS (McLean & Soden, 1977).

In a turbulent environment, ensuring organisational IS capabilities and IT infrastructure may, in fact, be more significant than the simple selection of a prioritised portfolio of IS applications (Ciborra, 1994).

A more long-term view of IS planning emphasises that planning should also lead to improved managerial capabilities needed in the IS planning itself (Ruohonen, 1991; Raghunathan & Raghunathan, 1991). The planning process should be consciously evaluated and improved (King, 1988; Baker, 1995).

By thus improving the "taken for granted" routines and complex relations between the IS function and other business functions in a firm, IS planning could, in the long run, become a unique capability and a source of sustainable competitive advantage (Mata, Fuerst, & Barney, 1995). E-business planning should therefore not be a one time planning process but a dynamic process that is continuously reviewed and improved.

3. Learning from comprehensive and incremental approaches for IS strategy planning

Although the objectives of IS planning are generally accepted, this does not apply to the views expressed about the appropriate IS planning process. Some researchers recommend a comprehensive process, while others have suggested that an incremental and informal process best ensures the achievement of IS planning objectives. In a similar vein, planning practices used in different organisations differ as well.

In comprehensive planning, managers attempt to be exhaustive in making and integrating strategic decisions (Sambamurthy et al., 1993; Lederer & Salmela, 1996). They involve large group of people from different organisational levels in the decision-making process (Earl, 1988). The organisation forms committees of users and IS specialists and carries out a procedure of several steps and the study usually takes several weeks or months (Lederer & Sethi, 1992). As part of this procedure they do extensive analyses (Raghunathan & Raghunathan, 1991; Bergeron, Buteau, &

Table 1
Comprehensive and incremental views about the IS planning process

	Planning characteristics	Comprehensive practices	Incremental practices
1	Plan comprehensiveness	Plans are complicated and highly integrated with overall strategy (King, 1978; Premkumar & King, 1994; Raghunathan & King, 1988).	Plans are simple and loosely integrated with overall strategy (Sambamurthy et al., 1994; Ciborra, 1994).
2	Approach to analysis	Formal, multiple analyses are used to derive plans (Earl, 1988; Raghunathan & Raghunathan, 1991; Bergeron et al., 1991).	Personal experiences and judgement are used to derive plans (Sambamurthy et al., 1993; Vitale et al., 1986).
3	Planning organisation	Planning is based on formal representation from many different organisational groups (Galliers, 1987; Earl, 1988).	Planning is based on an informal network of a few key individuals (Pyburn, 1983; Vitale et al., 1986; Earl, 1993).
4	Basis for Decisions	Formal methods and criteria are the basis for decisions (Ein-Dor & Segev, 1978).	Shared group understanding of a few key individuals is the basis for decisions (Sambamurthy et al., 1994; Ciborra, 1994)
5	Plan control	IS plans are periodically reviewed to adapt to changed circumstances (Galliers, 1987).	IS plans are continuously reviewed to adapt to changed circumstances (Earl, 1993; Vitale et al., 1986; Sambamurthy et al., 1993).

Raymond, 1991). To manage the large planning group and diverse analyses, at least some degree of formality is needed in the planning process. Because of the large visibility of decisions, they use documented criteria in making the decisions (Ein-Dor & Segev, 1978). Table 1 summarises practices that are typically used in comprehensive planning.

A large number of planning methods exist that define almost a step-by-step procedure for a comprehensive formulation of an IS strategy. Instructions for conducting IS planning are provided in Critical Success Factors method (Shank, Boynton, & Zmud, 1985), IBM's Business Systems Planning (Zachman, 1982), and Andersen Consulting's Method/1 (Lederer & Gardiner, 1992), to mention only a few.

The comprehensive approach is grounded in the comprehensive approach to strategy formulation (Faludi, 1976) and in the traditional strategic management theory (Ansoff, 1965; Steiner, 1972; Ansoff & Sullivan, 1993; Rowe, Mason, Dickel, Mann, & Mockler, 1996).

The critics of comprehensive IS planning have suggested that the need to rely on formal planning methodologies and predefined criteria can trivialise planning so much that it becomes merely a simple top-down exercise (Vitale, Ives, & Beath, 1986; Sambamurthy et al., 1993). They have noted that formal planning has also been shown to replace, rather than support informal communication (Pyburn, 1983). A short process does not necessarily provide an environment for learning and for deriving a strategic vision (Reponen, 1994). The critics have also pointed out that users and managers consider comprehensive and formal analyses as costly and remote (Earl, 1993).

The critics warn that in a changing business environment comprehensive planning simply may not provide the necessary flexibility to be effective (Pyburn, 1983; Vitale et al., 1986; Ciborra, 1994).

In contrast to comprehensive planning, some organisations practice a more incremental approach. For them, planning focuses on a few or perhaps just one theme and IS decisions are made on a one-by-one basis (Earl, 1993). This focused agenda keeps the planning team small and enables planning to be based on informal contacts among team members (Pyburn, 1983). It also allows the use of personal experiences and experimentation with new and innovative ideas, sometimes at the relatively low levels in the organisation (Ciborra, 1994). Table 1 summarises practices that are typically used in incremental planning.

In incremental approach, explicit planning methods are seen as having only a minor role. While methods can be used, they are seen more as process enablers (Earl, 1993) to be used in an ad hoc manner (Ciborra, 1994). Consequently, the incremental approach does not provide similar explicit step-by-step methods for IS planning, as was the case with comprehensive approaches. The process is informal and rests very much on the ability of key managers to include the right people and conduct the right analyses.

What might be considered as closest to an incremental method is the Continuous Strategic Alignment method described by researchers from the MIT-school in the early 1990s. In essence, the method identifies five different alignment mechanisms (Venkatraman, Henderson, & Oldach, 1993, p. 144):

1. governance process, which specifies the allocation of decision rights;
2. technological capability process, which specifies and modifies the IT products and services needed to support and shape business strategy;
3. human capability process, which specifies and modifies the various human skills to support and shape business strategy;
4. value management process, which allocates the required resources and ensures maximal benefits from IT investments;
5. strategic control, which attempts to maintain internal consistency among the four mechanisms.

Hence, the method acknowledges the need for a dynamic administrative process to ensure continuous strategic alignment between the business and IT domains.

Incremental planning is based on the theory that organisations learn and benefit by adapting based on their learning (Argyris & Schon, 1978). It draws many of its principles from the behavioural theories of business strategy making (Quinn, 1980; Mintzberg, 1994).

Some reported difficulties illustrate why incremental planning might fail. In particular, senior managers have expressed concern that incremental planning fails to address critical needs (Earl, 1993). For example, from their perspective developing new systems locally can mean that potentially strategic applications can be dismissed as “just end user hacking” and never get sufficient resources to become organisation-wide innovations (Ciborra, 1994). Some IS managers have warned about poor definition of IS requirements and infrastructures (Pyburn, 1983; Earl, 1993). Others have worried about how future planning themes would be generated. A new CEO, management team, or management style could erode the incremental planning process (Earl, 1993). Rapid responses to changing needs have also been seen as increasing the risk of incomplete projects (Pyburn, 1983).

The alleged limitations of incremental approach are concordant with the views stated in strategic management literature that, at the moment, there is limited formal support for the “strategic thinking” aspect.

In other words, a combined method would be needed to support the synthesising of qualitative and quantitative data into visions of the appropriate direction to pursue (Wilson, 1994; Mentzas, 1997; Heracleous, 1998).

4. Need for a new planning method

Comprehensive planning methods provide clear steps for planning a new IS strategy. Such methods make it easy for a practising IS manager to make a step-by-step plan for a comprehensive IS planning study. The risks associated with large special studies are, however, well documented in the IS planning literature.

Incremental planning literature does not provide similar methods to guide an incremental IS planning process. Even the continuous strategic alignment model by Venkatraman et al. (1993) is fairly general. While it identifies five different administrative processes, it does not provide detailed instructions for their implementation.

There are, however, reasons why explicit formal planning methods might be useful, even in incremental planning.

Although managers are likely to accept the principles of incremental planning, they may find it difficult to apply them in practice. Particularly in organisations, where managerial knowledge and experience about IS planning is low, methods can help in setting up a planning system. One recent case study (Cerpa & Verner, 1998) reported that methodologies such as CSF provided the means to set up a planning framework and to aid in evaluating the IS strategy.

Also, if the general planning style in the organisation is formal, an IS manager may find it difficult to rely on a very informal IS planning process (Pyburn, 1983; Earl, 1993). Hence, a formal IS planning structure may be needed simply because the senior and business managers are accustomed to such planning.

For instance, Quinn (1980) reported that even if total enterprise strategy is formulated informally and incrementally, top executives still required periodic updates and reviews from different subsystems. Lower level planning also relied on the use of formal methods and techniques. Hence, a formal IS planning structure can make it easier for senior management to integrate IS/IT projects with the events and plans in other subsystems and vice versa.

Finally, explicit methods are also needed in IS planning research, particularly if action research is used. One of the principal guidelines for conducting action research is that researchers should make their reasoning explicit and organise it in such a way that it is testable (Susman & Evered, 1978). Thus, explicit methods can make it easier for researchers to apply, test and improve the methods in a convincing manner.

5. Four cycles method

The development of the four cycles method is based on a research program on IS planning. During the years 1985–2000, altogether 18 action research projects on IS planning have been

conducted, both in the public sector and in private organisations both in Finland and the Netherlands.

In the Netherlands six large action studies were conducted at a consultancy firm (85–86), a production organisation of energy systems (86–87) and a bank (88–89) (Wassenaar, 1995). These organisations were evaluated from a transactional perspective. From 1989 till now a longitudinal action study was conducted in a large hospital (Wassenaar, 1995; Spil, 1996; Sikkel, Spil, & van de Weg, 1999). From 1987 till 1996, a university IS strategy was evaluated and influenced (Spil, 1996) and from 1999 until now we study a facility management organisation (not yet described). All these studies have led to the notion that a “new” method was necessary.

The research program in Finland comprised altogether 12 action research projects during the years 1985–2000 (Mills, Reponen, & McFarlan, 1988; Ruohonen, 1991; Reponen, 1994; Salmela et al., 1996, 2000). The client organisations represented a wide variety of different industries (paper industry, electronics, furniture, finance, wholesale, construction) and public services (labour protection, education, defence). In majority of the cases, planning followed a comprehensive approach, with special emphasis on organisational commitment and learning (Ruohonen, 1991; Reponen, 1993). While many of these planning studies were clearly successful, there were also cases that suffered from lack of involvement and poor implementation of plans (Reponen, 1994). The cases where incremental planning was used were not without problems either. In one case, for instance, planning assisted in identifying a strategic application but failed to provide sufficient resources for its prompt implementation (Salmela et al., 1996). Overall, the experiences gained led to the idea that a combined approach might work better than either extremely comprehensive or extremely incremental approach.

The four cycles method divides a chosen period of time into four different planning cycles: (1) agreeing on planning objectives, (2) aligning business objectives and information objectives, (3) analysing IS resources and IT infrastructure, and (4) authorising actions.

The main difference to comprehensive methods is in the process but also typical informal outputs like mind mapping are added. The four basic cycles are repeated each period. Analyses that in the traditional comprehensive methods are carried out within a few weeks or months can now be distributed over the whole period. Because the same cycles are repeated periodically, some analyses can be distributed over several years. In addition, the repeating cycles ensure the monitoring and updating of strategies on an annual or even quarterly basis.

The planning cycles and associated planning tasks are summarised in Fig. 1 and are now elucidated. Because the contents of each cycle are similar to well established comprehensive and incremental methods, repeating all tools and prescriptions was not considered necessary but we want to give more detail than just give an overview. The objective is to illustrate the contents of planning in each cycle by identifying some relevant pieces of research.

5.1. First cycle: agreeing on planning objectives and stakeholders

“There’s nothing more practical than a good theory.”

The first cycle begins with an assessment of progress in implementing IS decisions and plans. Also new issues requiring immediate attention can be brought into the planning agenda. If they require immediate action, a special task force can be assigned to start investigating the issues. As

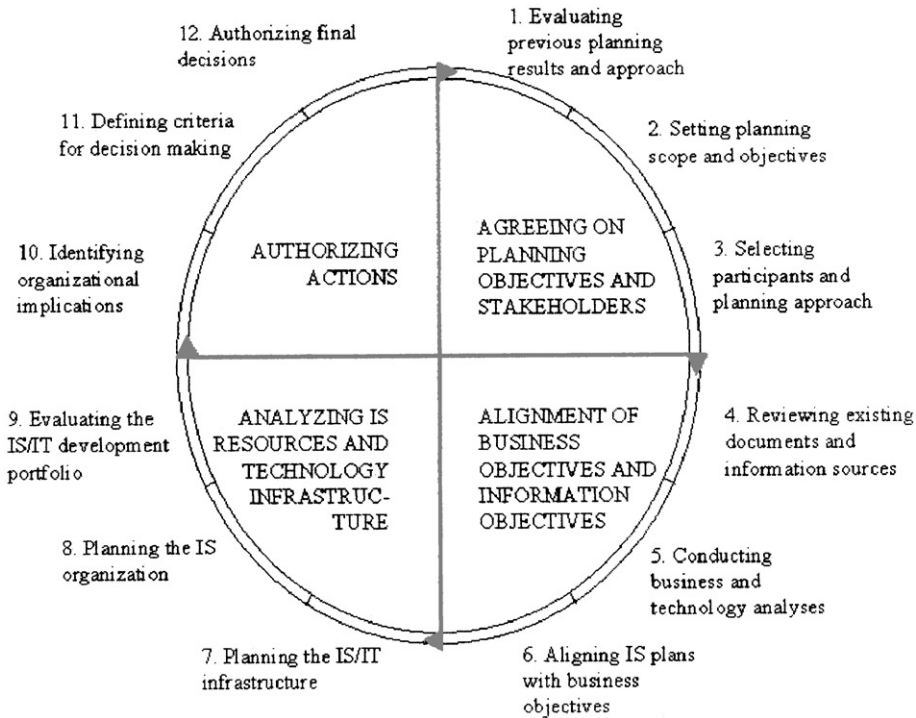


Fig. 1. Four cycles method.

each cycle begins with a short update session, implementation of plans can be monitored on a quarterly basis.

The primary planning objective in the first cycle is, however, the evaluation of the selected planning approach. If no problems are evident, an informal situation appraisal of the planning process at the beginning of a new planning year can be adequate (Dyson & Foster, 1980; Baker, 1995). Problems in the planning process, such as inadequate participation or failure to implement plans (Lederer & Sethi, 1988; Premkumar & King, 1994; Mentzas, 1997), suggest that a more thorough analysis may be needed.

The cycle comprises the following three planning tasks:

1. evaluation of previous planning results;
2. setting the scope of planning and selecting objectives;
3. selecting participants and adjusting the planning approach.

In essence, managers are asked to critically assess the results that have been achieved with the organisation's current approach to IS planning. Based on this assessment, they evaluate whether more, or less, of their time should be devoted to IS planning. The managers therefore choose which of the listed activities (Tables 2–4) they want to perform in the next period. Outcome can be that this year they only produce a thorough list of current and planned projects (3) but also that all 45 activities are conducted. Also the way planning is approached (degree of formality, comprehensiveness) is discussed. The objective is to choose an approach that best fits the planning

Table 2
Potential outcomes of the first planning cycle

<i>Evaluation of previous planning results</i>		
1	Information year report	Contains an assessment of all running projects on the aspects time, money and quality in comparison with the project descriptions as decided upon. A good example is the financial year report.
2	Information management control range	Summarises the claims on budgets and decisions on projects that already have been made. Together with the total budget it shows the range of (financial) planning for information management.
3	List of current and planned projects	Provides a complete overview of all running and planned projects with risks, benefits and participants.
<i>Setting the scope of planning and selecting objectives</i>		
4	Set of critical planning objectives	Contains a set of information objectives that give direction to the content of the outcomes of this planning process. These can be drawn from branch information (benchmarking), from trends analysis and from corporate strategy.
5	List of targeted planning outcomes	Contains a list of the results that senior management and information management wants to reach during the coming year. Results are selected from all outcomes in Tables 1–4. In the simple end, outcomes can consist of a list of running and planned projects. In the complex end, a complete set of strategic information systems planning outcomes can be selected.
6	Scope for the IS planning process	This outcome elaborates the objectives and outcomes. It is based on an agreement on the ambition level of the planning process. This ambition can be defined for each outcome as characteristics (focus), time (long middle and short) and description level (global, detail).
<i>Selecting participants and adjusting the planning approach</i>		
7	A matrix with objectives, participants and phases	Assigns responsibility for achieving planning objectives to key managers. Schedules the planning process and assigns people to each planning task (when should a task be done, what should be done, and by whom).
8	Educational plan	Defines an overview of knowledge and experience that is needed and available in the planning process. Builds a training program for each participant in the planning process. Each outcome can be connected with a special training program.
9	An informal network of people to be involved	Defines roles for each participant (decide, inform, ask or train). By performing a network analysis, groups of people can be identified that like to work together.
10	Communication plan	Defines communication mechanisms to be used to communicate plans and to keep the process alive.
11	Analysis of contingencies	Describes the IT heritage (existing IT structure and the past successes and failures in IT), technology assimilation (the stage of adoption and management of the technologies in use), and the strategic impact of IS (positioning of the organisation in the strategic grid, assessing past and future strategic dependence on IS).
12	Planning approach and methods	Defines the approach selected to IS planning and explicitly explains how it fits with organisation characteristics described in the analysis of contingencies (11).

Table 3

Potential outcomes of the second planning cycle

<i>Reviewing existing plans, documents and information sources</i>		
13	List of existing useful documents	Past projects have created a large amount of documentation which, if properly documented, can be reused in the planning process including, for example, workflow diagrams and management control models.
14	Internal information sources	Sources for information about the current IS/IT perspective in the business, its maturity, business coverage and contribution, skills, resources and the technological infrastructure. Current strategy, objectives, resources, and activities and the culture and values of the business.
15	External information sources	Sources for information about technology trends and opportunities and the use made of IS/IT by external bodies. The economic, industrial, and competitive climate in which the organisation operates.
<i>Conducting business and technology analyses</i>		
16	Implications of corporate strategy for IS objectives	Identifies business goals and plans and deduces IS requirements via a formal method for translating them.
17	Implications of other business analyses for IS (CSF, SWOT)	Identifies critical processes in the organisation (core competencies) to be supported by information systems. Combines and groups the critical success factors with the strengths, weaknesses, opportunities and threats to derive information objectives.
18	List of new future acts or events	Indicates for the coming three years how markets and clients can change, what opportunities for data retrieval there will be, which technical progression is suspected, which organisational changes are planned and possible, which new methods are in theory available. What is the budget prognosis for the coming years and which new activities can we develop and which activity we should drop.
19	Classification of certainty of acts and events	For each act or event found in outcome 18 a certainty and time scope is given to evaluate which act or event needs attention
<i>Aligning IS plans with business objectives</i>		
20	List of new project ideas with priorities	Lists initial project ideas and opinions of the participants about their priorities costs and risks. For high priority ideas the risks and benefits of the ideas are worked out in detail and according to those results a new priority scheme is made.
21	Aligned IS plan and project priorities	Documents the shared vision between senior managers of the organisation in which direction information systems should go. Clear priority decisions are made by senior management and information management on which objectives and which ideas priority is given.
22	Senior management participation	Describes how senior management will control that the agreed priorities are taken into consideration in the rest of the planning process.

environment, planning tasks and expectations of participating managers. In practical terms, the main task in this cycle is to agree on the planning objectives and accept a schedule for the coming period.

Previous IS literature provides many useful analyses that can be used to support these tasks. Some of them are listed below. Furthermore, Table 2 lists documents that can be developed, updated and/or used within this cycle.

Table 4
Potential outcomes of the third planning cycle

<i>Planning the IS/IT infrastructure</i>		
23	Identification of core business areas	The identification of the core business areas elaborates earlier analysis of core business processes (outcome 17) with the analysis of the degree to which a competence is significant in terms of access to wider markets, customer significance, and risk of imitation.
24	IS support for core business areas	Describes for each core area why it is important and how each area are composed (results of the noun/verb analysis). Illustrates supportive IS functions (results of the functional analysis systems technique diagrams).
25	IS needs	Describes the information needs, conceptual information systems, the business conclusions and recommendations, the application portfolio and the business information models.
26	Information technology developments	Identifies most relevant IT developments from the business perspective. Reviews the latest publications in IT and describes shortly a reference list to access more information (most likely hyperlinks).
27	Technology assimilation plan	Defines a timetable for adopting the most promising technologies, given the current technology and IT heritage of the organisation.
28	Future infrastructure	Management and control description of the future data, application, computing and communication infrastructure.
<i>Planning the IS organisation</i>		
29	Strategy and structure of the IT function	Contains a decision on the location of the responsibility, authority and activities of information management either centralised, distributed or decentralised.
30	Rules and regulations for the IT function	Describes general rules as well as quality and service levels for all services provided by the information management function. These agreements can be matched with financial agreements between the IT function and users.
<i>Evaluating the IS/IT development portfolio</i>		
31	Current investments and costs	Provides a clear picture of the current financial situation of all IS cost centres with given budget and used budget. Provides a long-term prognosis of project budgets in major on-going IS/IT projects.
32	Future investment possibilities	Describes the future capabilities of the IS function to initiate new projects and to maintain high quality in the provided services.
33	IS future benefits	Defines the overall quantitative and qualitative benefits that the IS/IT project portfolio can leverage.
34	Proposed IS/IT project portfolio	Describes the proposal for the IS/IT portfolio and documents other important outcomes the scenario analysis process.

Evaluation of previous planning results is a natural starting point for the evaluation of the selected approach. The managers should monitor the implementation of plans, not only to revise the plans, but also to evaluate whether the goals, resources, analyses, processes, outputs and outcomes of the IS planning itself are appropriate (King, 1988; Raghunathan & Raghunathan, 1991). In essence, there should be sufficient feedback mechanisms to allow managers to improve their IS planning effort (McLean & Soden, 1977; Baker, 1995).

Because IS planning can have multiple objectives and it can serve many different interests (Galliers, 1991; Ciborra, 1994), it is important that the emphasis of different objectives is clearly

stated. Planners should ensure that senior managers perceive the issues in the planning agenda as important for the strategic goals of the organisation (Ein-Dor & Segev, 1978; Goodhue, Quillard, & Rockart, 1992). Also, short-term opportunities and problems with direct implications to users should not be forgotten (Boynton & Zmud, 1987).

The importance of selecting skilled people from various parts and different levels of the organisation is also well documented (Galliers, 1987; Boynton & Zmud, 1987; Sääksjärvi, 1988; Premkumar & King, 1994; Ruohonen, 1991; Spil, 1996). It is also important to define the groups that need to be interviewed, informed or trained (Boynton & Zmud, 1987).

Furthermore, a contingency analysis (Feeny, Edwards, & Earl, 1987; Earl, 1989) can be used to evaluate the degree to which the planning approach fits with the contextual variables. Planning approach should not differ too much from the organisation's general planning style and control structure and it should also reflect the complexity and significance of the organisation's IS and the consensus about the mission of organisation's IS department (Earl, 1989; Doukidis, Mylonopoulos, & Lyberias, 1994).

While many researchers have pointed out the significance of critically evaluating the planning approach, existing e-business planning does not incorporate it in the planning process. The four cycles method does not provide a ready made solution. Instead, managers are asked to decide how planning should be approached and whether they find a formal, or informal, approach to be more natural. Such discussions are expected to promote continuity and learning of key participants. Time as a valuable asset in e-business strategy planning should be used as effectively possible.

5.2. Second cycle: alignment of business objectives and information objectives

“Information is not a goal, it is a support for the organisation.”

Also the second cycle begins with a review of current issues and progress in implementing IS decisions and plans. Thus, if new issues have occurred after the beginning of the first cycle, they can now be addressed.

The main task in the second cycle is to promote strategic thinking, creativity and innovation in the planning process but also to ensure sufficient integration of IS plans with business plans. The emphasis is on identifying future IS projects that provide business value and support both business strategy and business processes.

The second planning cycle comprises three planning tasks:

1. reviewing existing plans, documents and information sources;
2. conducting business and technology analyses;
3. aligning IS plans with business objectives.

In essence, the participating managers are asked to re-examine the assumptions about the business needs and technology opportunities used in previous plans. This new information is then used update IS priorities for the future.

Previous IS literature provides many useful analyses that can be used to support these tasks. Some of them are listed below. Furthermore, Table 3 describes documents that can be developed, updated and/or used within this cycle.

Even if the objective in the second cycle is to create new plans, existing IS plans can be used as a flexible framework within which the implications of changing circumstances/strategies can be

identified and managed (Galliers, 1991). Information sources analysis can also be used to evaluate current planning documents and existing information sources (Ward & Griffith, 1996).

The corporate business strategy (if such exists) can be carefully studied each year and all impacts for information management listed. Other business analyses can embody the analysis of current and future business environments, critical success factors, strengths and weaknesses, and programs of the organisation (King, 1988; Raghunathan & Raghunathan, 1991).

The relationship between strategic business plans and IS plans should be seen as an iterative (Henderson & Sifonis, 1988). Hence, the process should also incorporate the tracking of key developments in technology to enable the managers to spot opportunities, which can give them a competitive advantage (Boynton & Zmud, 1987; Earl, 1988). Also, the likelihood of events can be evaluated (Mintzberg, 1994).

Brainstorming sessions can be used to discuss new ideas for using IS. Buzan (1995) has developed an instrument to make quick associations with a specific subject. A voting system can be used to decrease the number of ideas (Stevens, 1997). In any case, the process should reduce conflict that revolves around uncertain assumptions (Henderson & Sifonis, 1988) and it should also enhance communication of the objectives between senior management, IS management, and user management (Ruohonen, 1991).

Given the amount of interest in aligning IS with business, it is no surprise that the analyses in the second cycle are quite “traditional”.

In comprehensive methods (and in the planning practice in many companies) innovation of new opportunities and making of organisational decisions about IS priorities are scheduled very close to one another. Since many stakeholders also need to protect their own interests and needs, such process does not promote “creativity and strategic thinking”. In the four cycles method, the second cycle is devoted to analysis and innovation. Final decisions can be made later. There must be room for new ideas. Restrictions are the emergent nature of the changes and the difficulty of formalising creativity and innovation.

5.3. Third cycle: analysing is resources and it infrastructure

“A new information system is rarely build upon a green field site.”

Again, the cycle begins with a review of current issues and progress in implementing IS decisions and plans. Thus, if new issues have occurred after the beginning of the second cycle, they can now be addressed.

The planning during the third cycle concentrates on assessing current information and communication technology (ICT) architecture and IS skills, and in preparing for the future. The cycle can be seen as comprising the following three planning tasks:

1. planning the ICT infrastructure;
2. planning the ICT organisation;
3. development of a preliminary project portfolio.

The third cycle adds realism to planning by bringing in resource capacities and constraints under which the IS function operates. A concrete objective is to develop a preliminary project portfolio that includes both IS development projects and projects for improving the ICT infrastructure.

Previous IS literature provides many useful analyses that can be used to support managers in these tasks. Some of them are listed below. Furthermore, Table 4 describes documents that can be developed, updated and/or used within this cycle.

Weill and Broadbent (1998) provide a large selection of tools and concepts for developing an ICT infrastructure. Such tools enable development of IT infrastructure that supports strategic applications and integration of multiple businesses or functional groups. They also assist in demonstrating the value of IT investments to senior management.

Mentzas (1997) and Ward and Griffith (1996) provide a comprehensive list of tasks for making IS/IT infrastructure decisions: diagnose current state and describe functional descriptions for each process, identify functional inefficiencies, create new business process models and analyse both organisational processes and interdepartmental relations (Ward & Griffith, 1996).

Functional analysis techniques from strategic management can also be helpful in analyses (Stevens, 1997). For each core business area two questions can be asked: why is this area so important and how is it composed (noun/verb analysis). With Functional analysis diagrams a group can identify supportive IS functions (Stevens, 1997).

IS organisation and the development of human resources is an important category in the ICT infrastructure (Earl, 1989; Ward & Griffith, 1996; Galliers & Baker, 1994). A functional centralisation–decentralisation model can be used to describe the structure of the IS organisation (Robson, 1997). The rules, policies and regulations for ensuring integrity of infrastructure and information can now be evaluated and updated (Earl, 1989). Also, questions related to outsourcing of IS services can be addressed (DeLooff, 1997).

Scenario analysis can be used to formulate a preliminary IS/IT project portfolio (Schoemaker, 1995). A comprehensive analysis can involve 10 steps, starting from identification of scenario themes, stakeholders and technology trends and ending up in constructing initial scenario themes, checking for consistency and plausibility, identifying research needs and evolving towards decisions.

The infrastructure is increasingly seen as a fundamental resource that differentiates the competitive performance of firms (McKenney, Copeland, & Mason, 1995; Weill & Broadbent, 1998). Making right decisions about ICT infrastructure is a challenging task. In principle, the decisions would require multiple analyses from both technical and business perspectives. It is also obvious that the decisions have to be made incrementally, as both business needs and technology options evolve over time.

Making long-term decisions about ICT infrastructure within one comprehensive study is difficult. The advantage of the four cycles method is that the plans for ICT infrastructure and IS organisation are updated periodically. New infrastructural challenges can be emerging and taken into account.

5.4. Fourth cycle: authorising actions

“No statements but actions.”

If new issues have occurred after the beginning of the third cycle, they should be addressed before seeking approval for the major IS projects.

The fourth cycle concentrates on preparing clear proposals for action. The objective is to ensure firm commitment of resources to implement the IS projects and to acquire the IT resources and IS capabilities. This cycle comprises the following three planning tasks:

1. identifying organisational implications;
2. defining criteria for decision-making;
3. authorising final decisions.

The emphasis in the fourth planning cycle is to identify major organisational and business changes associated with the projects and to seek line management acceptance for them. The primary objective is to reduce potential for conflict that might jeopardise the implementation of plans (Segars & Grover, 1998).

Previous IS literature provides many useful analyses that can be used to support managers in these tasks. Some of them are listed below. Furthermore, Table 5 describes documents that can be developed, updated and/or used within this cycle.

Table 5
Potential outcomes of the fourth planning cycle

<i>Identifying organisational implications</i>		
35	Impact on organisation	Lists organisational implications (both positive and negative) for each proposed project, as seen by users and specialists.
36	Contingency plan	Identifies changes that can happen in the near future and identifies actions that can/should be taken in individual projects if changes occur.
37	Human resource plan	Assigns human resources to projects and defines an education plan associated with each.
38	First drafts of project proposals	For each IS/IT project, a draft project proposal is formulated which describes the business reasons for initiating the project.
<i>Defining criteria for decision making</i>		
39	A uniform set of selection criteria	Lists the criteria to be used in selecting IS/IT projects, e.g. fit with the organisational objectives and information needs, availability of resources (expertise, time and money) for execution, project costs and benefits.
40	Weighing of the criteria	If level and importance of criteria differs too much then a weighing of the criteria can be defined.
<i>Authorising final decisions</i>		
41	The concept of IS/IT portfolio	Describes the IS/IT portfolio with the highest score. Provides a tentative choice that can be communicated to relevant stakeholder groups.
42	Stakeholder views on IS/IT portfolio	Documents the views expressed by different groups during a group (or bilateral) selection process. Summarises commonly accepted choices as well as controversial issues.
43	Risk and value analysis	Summarises the risks and benefits of tentative IS/IT portfolio(s) as a whole and lists the projects in terms of risks and benefits/value.
44	Final IS/IT portfolio	Describes the IS/IT portfolio that has been formally approved by top management.
45	IS management coordination structure	Assigns responsibility of implementing the different projects and defines how the progress in implementing the plans will be monitored.

Organisational implications of implementing the IS plan should now be carefully included in the plan (Galliers, 1987). An organisation plan in Andersen Consulting's Method/1 comprises issues such as assignment of personnel to tasks, development of change management approach, and identification of issues that can prevent, or facilitate, adoption (Lederer & Gardiner, 1992).

Defining criteria for decision-making constitutes an important task in the authorisation cycle. Even the most carefully prepared action plan can stumble, if there is no method for setting prioritising between alternative options (Hopstaken & Kranendonk, 1991).

Value management (Stevens, 1997) can be used to increase commitment to decisions. In this approach, the formal authorisation starts with a concept of final IS/IT project portfolio. A group process or bilateral processes can be used to create a common perspective and clearly note all exceptions of the common perspective. In any case, the decision process should allow ample opportunity for debate and airing of different views (Checkland, 1991; Galliers, 1987).

The actual authorisation process in the four cycles method does not differ remarkably from the prescriptions in comprehensive methods. IS decisions are approved as one integrated plan. However, it is important to note that in the four cycles method, the implementation of decisions is monitored on a quarterly basis. Periodic review of plan implementation in the beginning of each cycle should ensure that important projects are not delayed because of lack of resources or organisational politics.

Also, modifications can be made on a quarterly basis to adapt to changes in technology or business environment. In a volatile business environment, using a whole calendar year to generate new plans can be too slow. In such environment, a planning period can be reduced to six or even four months. Such planning would allow plans to be recreated even within a very short time.

6. Contributions and conclusion for practice and research

Much of the strategic IS planning methods popularised in the late 1980s and early 1990s have gone out of favour. Managers still remember the problems in implementing the detailed plans that resulted from the IS strategy studies. They are also painfully aware that the real business challenge is not to achieve strategic alignment when planning is carried out, but the ability to continuously refresh and adapt the strategic vision that aligns IS with business.

The objective of the four cycles method is to facilitate managers in implementing a continuous planning process. It provides a periodic planning schedule and identifies issues (Each period had a constant focus on external developments and the fit with internal possibilities) that should be addressed periodically. Hence, the method should be useful in organisations that prefer to have some degree of formalism in their IS planning process.

It is important to note, however, that the process allows considerable flexibility in choosing an appropriate planning process. Hence, planning can be adapted to the significance of the issues (or themes) in the planning agenda. It can also reflect the expectations of "good management practice" in the organisation as a whole.

If managers consider informal IS planning as most appropriate and natural, the process can be designed to meet only the minimal requirements. The managers can decide to have periodically only two meetings: analysis of planning results and monitoring of current and planned implementations. Every second period they can make an IT developments inventory and discuss

future IT infrastructure. Once in every three periods, a special session for the alignment of information domain and the business domain can take place.

For those organisations that prefer to have a more comprehensive process, more extensive analyses can be conducted in different planning cycles. For this purpose, the method provides a selection of relevant prescriptions and tools from previous IS planning literature. These can be used to ensure that the time used in planning meetings is effective. By making clear priority decisions, scarce time and resources can be spared and used elsewhere.

In general, the objective is to establish a continuous e-business planning process and to ensure that all critical aspects of IS planning are addressed periodically. Thus, managers can use the method to reduce the gap that often exists between the planning prescriptions and the way planning is practised.

If the four cycles method is compared with previous comprehensive methods, the key difference is that the planning process is continuous and repetitive. The continuous and repetitive nature of the process permits periodic evaluation of the selected planning approach. It should also promote innovation and creativity, as the idea generation does not have to be closely associated with the making of decisions over IS projects. Also, the complex analyses and decisions about ICT infrastructure can be made incrementally, over several years. In essence, it should avoid many of the problems typically associated with the comprehensive approaches.

The four cycles method adopts many features from the incremental IS planning literature. Most importantly, the process is seen as continuous and it allows reformulation of plans throughout the period. The key difference comes from the role of formal methods. While acknowledging that formal methods can only be one building block, it is assumed that even incremental IS planning could benefit from a formal planning structure and schedule.

The use of a formal method is presented as one means for an organisation to avoid some of the alleged problems of the incremental approaches, such as poor definition of infrastructures, high proportion of incomplete projects or discontinuity in planning due to changes in the management team.

The four cycles method is well grounded to existing literature and to a series of action research projects conducted in several organisations. Nevertheless, it has not been tested in practice. The rationale for describing the four cycles method prior to testing it is that the description provides a basis for future action research projects. The objective is to explicate the reasoning behind the four cycles method and to make it publicly testable. Future research is needed, however, to demonstrate the methods strengths and weaknesses, to establish under what circumstances it is more applicable and also under what circumstances it is less applicable.

Thus, perhaps most importantly, this paper argues that the use of appropriate IS planning methods is still relevant for recognising and making of e-business strategy, both for research and for practice. Future research should focus on the inter-organisational nature of e-business strategy. If it is difficult to get top management participation, it will be more difficult with more organisations involved.

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