

94 007

ET

Faculty of Economics and Econometrics
Department of Information Management and Information Technology

05348

Serie Research Memoranda

An Innovation Model of Information Planning

Michael S.H. Heng
Eileen M. Trauth
Sven J. Fischer

Research Memorandum 1994-7

March 1994





An Innovation Model of Information Planning



Michael S.H. Heng *, Eileen M. Trauth **, Sven J. Fischer *

* Faculty of Economics and Econometrics, Vrije Universiteit Amsterdam

** College of Business Administration, Northeastern University, Boston

Abstract

The literature of information planning depicts a rational, proactive, formalistic and logical approach to information technology strategy formulation. However, empirical studies have revealed serious problems with such an approach reporting, instead, that the success of IT strategy is often due to the role of IT champions. This paper reports on case studies of ten IT champions in the Netherlands. The institutions at which they work are in the financial, transport, government and software sectors. The findings show that the IT champions display clear leadership qualities, use signals from the markets/customers as a primary source of ideas, and devote much of their time and energy to communicating their ideas and to obtaining resources. They are also sensitive to human and organizational problems, are keen to develop products quickly, and often use prototyping to demonstrate feasibility. They prefer information planning sessions of short duration and are unafraid to bend rules when necessary. Unlike IT visionaries, they do not focus on technology for its own sake but, rather, emphasize the pragmatic benefits of using well-tested IT to solve problems.

Keywords: IT champions, information planning, information systems, leadership, strategic planning, innovation.



Introduction

If nothing is so practical as a good theory, then the history of planning for information technology introduction should give us pause to consider the theories in use. Complaints about the failure of IT to achieve expected productivity and flexibility improvements suggest the need to revisit the planning methods in use. In this paper we provide a critique of the current theory about information technology planning before presenting an alternative model of information planning which focuses on the characteristics of the *planner*, rather than the *plan*. It is derived from case studies of successful IT champions in The Netherlands.

The Bureaucratic Model of Information Planning

The received theory about information technology planning advocates a method by which the planner begins with a set of clearly defined business strategies and proceeds to construct a policy which will govern the type of systems to be developed and the priority for doing so. These business strategies take into account both business and IT trends. Based on this strategy, the planner then formulates an information policy. Information needs are collected, analyzed and represented in the form of an information architecture. A priority list of information systems to be built (or updated) and implemented is then drawn up with due consideration given to constraints such as existing technical infrastructure, potential benefits to the organization, and the likelihood of success.

A number of terms are used to describe this approach to information planning: Strategic Systems Planning, Information Strategy Planning, Business Systems Planning and Infor-

mation Engineering. They are intended to provide operational guidelines for formulating and implementing IT strategy. The approach embodied in these methods emphasizes the rational and formal aspects of organizational life. At best, it deemphasizes complexities and messiness inherent in actual organizational situations; at worst, it ignores them completely. Further, its theoretical underpinnings in bounded-rational decision-making present other problems. In this approach:

Strategy formulation is seen as an outcome of an interactive, multi-level process, where decisions are the outcomes of rational or boundedly rational debates. Certain assumptions are made within this view, such as: goals are known and consistent; actors are analytically objective in carrying out logical activities; cause-effect relationships are fairly well understood, and information is available to tackle most issues effectively. These are unrepresentative of organizational reality and generally simplistic. One other major flaw has been noted: the over-emphasis on analytical strategy content at the expense of the contexts in which these strategies are formulated (Waema and Walsham, 1990: 30).

Lederer, et al (1988) echo this concern in reporting the problems associated with using those methods. They question the practical value of mainstream IP theory.

Studies such as theirs have shown that the successful introduction of IT appears to occur not because of formal information planning methods, but in spite of them. At the same time, research has shown that an important factor responsible for IT success is the presence of IT champions who possess similarities with champions in technological innovation (Curley and Gremillion, 1983; Runge and Earl, 1988). The results of this line of research provide guidelines to recruitment and personnel managers. A subsequent line of inquiry was taken up

by Beath (1991) who examined the ways an organization could support the work of an IT champion. That study is useful to senior managers interested in creating the kind of environment conducive to IT champions.

However, these studies do not provide insight into how the IT champions actually work. There is a need to study the modus operandi of these IT champions. Formal information planning theory provides a framework of planning concepts within a static world view. We suggest that the application of knowledge from the champion literature offers a more process-oriented or dynamic view of the information planning phenomenon (Fischer and Heng, 1994). In this view, we are imitating Peters and Waterman (1982) in their approach to learning how excellent companies perform.

Role of Champions in Innovation

Since *information technology* is a special case of technology in general, it follows that IT-based innovation can benefit from the experiences of technology-based innovation. The experiences of the latter have shown that one factor strongly associated with the success of technological innovation is the presence of champions (Schon, 1963; Rothwell, et al, 1974; Kanter, 1983). A champion is an individual who makes a decisive contribution to the innovation by actively and enthusiastically promoting its progress through the critical organizational stages. Schon (1963) points out that a champion is crucial to the promotion of a technological innovation. The champion does this actively and vigorously, using an informal network. He or she often works unconventionally to overcome indifference and

resistance in the bureaucratic structure, and is even prepared to risk prestige and position to ensure the success of the innovation. A number of field and case studies have confirmed Schon's basic findings (see, for example, Roberts 1968; and Ettlie, et al, 1984).

Perhaps the most well-known project undertaken to study the characteristics of the innovation process was the SAPPHO (Scientific Activity Predictor from Patterns with Heuristic Origins) Project in Great Britain (Parker 1974; Rothwell, et al, 1974). The main aim of this project which was carried out in great detail between 1968 and 1971 was to confirm generalizations about technical innovation by comparing pairs of successful and unsuccessful innovation attempts. Of the 200 measurements analyzed, only five factors clearly differentiated successes and failures. One of these five factors was the role of key managers and technologists in the innovation process. These key individuals play the following roles:

Technical Innovator. The person who makes the major contribution on the technical side to the development and/or design of the innovation.

Business Innovator. The person who is actually responsible with the management for the overall progress of the innovation project.

Chief Executive. The formal head of the innovating organization.

Product Champion. The person who makes a decisive contribution to the innovation by activity and enthusiastically promoting its progress through critical stages.

These key individuals in the successful innovation efforts are usually more senior and have

greater power, respectability and experience than their unsuccessful counterparts. In a separate study carried by Peters and Waterman (1982) into the features of successful companies, the roles of these champions are again identified as an important factor.

The Research Study

Ten IT champions in The Netherlands were identified by the researchers in conjunction with several senior IT consultants. Initial contact was established through a telephone call and follow-up letter explaining the purpose of the research. Strict confidentiality regarding both the individual and his/her company was assured so that respondents would feel comfortable in giving an account of their work habits. Data was collected by means of unstructured interviews of two to four hours in duration. Critical Incident methodology was employed to elicit comments about a recent IT introduction which is representative of ones they have championed. The interviews were taped and transcripts were content analyzed in grounded fashion. At the beginning of each interview, background information on respondents and their companies was also collected. Table 1 shows information about the respondents' backgrounds, the type of work they do, and the organizations for which they work.

Insert Table 1 here

The Innovation Model of Information Planning

From analysis of the behaviors of the IT champions in this study, we offer an alternative

to the bureaucratic model of information planning. In this model the focus of attention is the *planner* rather than the *plan*. It should be pointed out that this model represents a composite of the characteristics of the IT champions studied. That is, not all respondents possess every characteristic discussed.

1. Leadership

The first set of characteristics in this model refers to leadership styles often associated with projects involving a considerable degree of risk taking.

1.1 Personal Responsibility

While discussing their experiences, the IT champions were very open about the mistakes they have made and the failed projects they have led. However, instead of explaining away the mistakes or identifying others to share the blame, they prefer to shoulder the responsibility.

Every manager makes mistakes. If you are high in the [organizational] tree, very near the board of directors, and you are starting such things, you have to take responsibility and you have to protect everybody else. If not, your company will not have any creativity anymore.... I compare it sometimes to a family.

Where possible the IT champions take their teams into confidence, sharing with them their hopes, fears and doubts. The champions are also very informal in their style of leadership, perhaps discussing matters over a glass of beer after office hours.

The champions were not, however, willing to describe themselves as the linchpin in the

success of a project, especially to the public. For example, when pressed to be absolutely frank about how much of the success of his department could be attributed to his personality or leadership style, one respondent reluctantly stated that it is about fifty to sixty percent. This comment is typical of those made by the other respondents. Though they are quite forthcoming in owning up to failures, they like to share credit for successes.

You have to find some people in the organization whom you can combine your interests with. You have to meet some guys in the organization, who will say: "I would like to have that." Make them owner of the problem. Give the problem away, give the solution away. They like to have a test in their own situation in their own area. I said, "Well make them project leader, project owner, we are just supporters." A success has many parents. ... Quite often they want also to claim extra credit. Give them extra credit. Then there is success in the procedure.

1.2 Political Skill

The IT champions are not only enthusiastic about an innovation, they get others to feel enthusiastic as well. One champion told of his experience:

I was in charge of a project but it was just me that was fighting everybody around me. I couldn't get it done on my own, that is why I believe you have to have at least two other people who are also enthusiastic.

Sometimes this skill is the result of their training at school.

I went to a Jesuit school. You were trained, already at fifteen, in group processes, in discussions, or what some people would put negatively: manipulation. ... I sometimes 'play the Jesuit' to organize, make

them enthusiastic.

Whatever their learning experiences, they are aware of the importance of energizing the innovation team and pay considerable attention to it. Because of their proximity to the top management, they encourage senior managers to show appreciation for the work of their team. Gestures like visits to the project development room or implementation sites and attendance at progress report meetings have symbolic significance.

The group is commended when they do well. They go out for dinner once a month. If they have to work overtime, their spouses get flowers for the extra family burden they have to shoulder.

Significantly, IT champions do not mention financial stimulants to motivate a team to tackle challenging and demanding projects nor do they mention financial rewards for success.

An example that vividly illustrates the 'political animal' inside the champions is their use of veiled threats with their superiors. When one champion failed to get the resources to fund what later turned out to be a very successful IT product, he suggested to his boss that he would start his own company to develop the product and sell it to the market himself. In this instance the simple veiled threat proved to be much more effective than diplomacy and talking.

1.3 Nonbureaucratic Methods

Sometimes, it appears that bureaucratic rules tend to get in the way of the work of champions. Consequently, they find it necessary to seek methods for getting around them. They have no qualms about 'finding rules to break rules' or seeking loopholes that enable

them to ignore what is perceived as a restriction to the IT innovation.

1.4 Human Relations

"Make everybody who works with IT feel important," one champion said in trying to sum up how he looks at the issue of human relations. Human relations is given close attention. In one case a very good technician in a responsible post is being assisted by a human relations expert to help him handle problems that arise. During the discussion of political skill, it was noted that a champion goes to the top management to show the IT group that the organization knows that their work is deeply appreciated. The attention given to the human factor reflects the philosophy that while hardware and software are important, it is the idea that is central. What is crucial is to have the right people; with good people a good system can be built. The IT champions also emphasize building a culture of trust. It is difficult to work with ease of mind if one doesn't trust one's colleagues.

It is noteworthy that most of the IT champions do not have formal training in IS or IT.

Perhaps reflecting this diversity in their own backgrounds, they prefer a team with varied educational backgrounds.

2. Communication

The second group of characteristics in this model is related to communication. The IT champions understand the importance of both talking and listening.

2.1 Keeping Participants Informed

All the IT champions who participated in this study are articulate, communicative and very open. In addition, they are aware that this trait is an asset in their work. They pay considerable attention to the use of various methods in communicating to all the parties concerned with their projects. In the case of a project funded partly by the government, the champion in charge of the project makes it a point to distribute popularly written press releases to the mass media. Such public relations exercises are needed to ensure continuing support from the funding bodies. The same idea is essentially used by another champion who writes short pieces for the in-house newspaper.

They take time to make presentations to top management and to the heads and staff of the various departments who are in one way or another involved in the IT project.

My boss gets many invitations. So I make it a point to report to him, to provide him with materials to support his public relations activity. And of course to back up his conviction. There is much external 'showing off.'

In the case of an R & D project, another champion would regularly scan related scientific and trade journals and pass the interesting articles on to the team. This behavior is quite similar to that of the gate-keeper in R & D laboratories (Allen and Cohen, 1969).

2.2 Securing Resources

The need to obtain resources for an IT project is too important for anyone to ignore. In an earlier stage of his career, one champion found it necessary to work overtime in order to convince top management to give him the resources he needed. He worked after office hours

to build a prototype at home, using his own resources.

Even after they have established a good record, they continue to pay considerable attention to this activity. One champion said he presents the case for resources in such a way that supporting him is seen to be in the manager's best interest. Having a wide network of contacts proves useful because

...there are so many rules to [follow in] getting a budget, so many ways. You have to know the right people.

One IT champion is involved in a project that is aligned to the normal activity of the company. He was able to capitalize on his remarkable track record to gain the confidence of his superiors to be able go ahead with the project, but only in an incremental way.

I got together the ten most important people in the company in one room. I had prepared a seventy minute presentation. The founder of the company was there. Everybody was enthusiastic. Then it started, but [I received] only one person, and [that one] only part-time. Later it became a team of twenty people.

2.3 Obtaining Support

The champions expend a great deal of time and effort in obtaining approval from stakeholders. They consider this activity to be as crucial to the success of the project as gaining commitment and support from top management. Consequently, the champions make a conscious effort, from the earliest stages, to move throughout the company getting support for the idea. The stakeholders' knowledge level about IT is directly correlated to the level of support they will provide. For this reason the champions make sure that the stakeholders

understand about the IT in question.

Users are not interested in the product if they cannot use it to support their work. That is why in the case of one bank, the champion emphasized running courses to show users how to obtain information from data. Moreover, they try to work out a win-win situation with their clients. One champion in a bank noted:

Don't only look at your internal needs for information, think also about the needs of your clients. You already have the information, so you can give this information to your clients too. Along with the importance of the product or service you deliver, your knowledge and personal attention to your clients is the information you give to them.

2.4 Maintaining a Network of Contacts

One significant aspect of the modus operandi of the champions is the wide network they have built up in the course of their career. One champion spends time actively participating in professional bodies like the Dutch Association of Computer Scientists (Nederlandse Gemeenschap voor Informatici). Another champion spends about two days a week looking for new solutions and new problems. He is constantly in search of IT products (both software and hardware) that can be relevant to his company. He is also active in user groups and various other kinds of networks.

These champions not only know many key people within their own companies, but those outside as well. Very often they are on friendly terms with their professional counterparts in competitor companies. These contacts are established by attending and presenting papers at

conferences, by giving guest lectures, by doing community volunteer services, and by keeping in touch with the colleagues from school.

2.5 Listening to the Marketplace

In one situation a champion developed an IT vision based on the demands that the clients were placing on his organization. In general, the customers/users are considered by champions to be a very significant source of ideas, especially ones about possible software applications. Sometimes, the information about client expectations comes from the marketing department.

One champion indicated that his company does considerable marketing research. To encourage its employees to be positive toward ideas coming from clients/customers, one company installed an idea box for the employees and rewards good ideas. Another method for obtaining marketplace information is for the champion to conduct regular exchanges with individuals in the company who are close to the clients/customers.

3. Adaptive Planning

The third category of characteristics possessed by the IT champions refers directly to the way in which they carry out information planning activities. They view planning as an adaptive process in which events in the environment trigger the need for responses. As they move steadily amid the unknowns toward their goals they collect feedback along the way to guide their behavior (Trauth, 1979; Trauth, et al, 1991, p. 155-156).

3.1 A Pragmatic Vision

One thing all of the champions have in common is that they are guided by a personal vision about the role of IT in serving their companies' organizational goals. One champion developed his vision about using IT to provide new services because of demands that the clients were placing on his bank. Another derived his vision from an in-depth understanding of the potential of artificial intelligence in coping with information-intensive activities. Whatever the source, these visions are not technology-driven, however. The champions are not out to use state-of-the-art technology for its own sake. Rather, they talk of using well-tested technology.

I think the technology push is not so important. The most important change has to come from new applications, given the old technology. If you have an idea, there are a lot of companies who can give us the technology to do that.

Though guided by the vision about the strategic importance of IT to their companies, they are also aware of the limitations of a narrowly constructed, technology-orientated approach.

Everybody thinks that if there is technology, you can solve something. Which is crazy. I mean, go to Buddha and sit there for a few days and you know you can solve a lot of things without technology.

However, they are certainly not resistant to using leading edge technology when it is appropriate to do so.

Finally, the IT champions are knowledgeable about both the IT and the application domains. Their in-depth knowledge of the domain, and ability to speak in that language enables them to derive their visions from the real world of actual needs and opportunities.

3.2 Prototyping

To the champions time is a very important consideration in the development of an IT product. They stress the need for flexibility, the ability to make a quick response to changes in the market or in government. Technical elegance takes second place in the drive to deliver to the (internal or external) marketplace an operational product.

3.3 Information Planning of Short Duration

The comments about quick response and flexibility should not be construed to mean that IT champions despise planning and spend no time on it. They do spend time and effort on planning, though not so much on formal, traditional planning. One champion heading a group of fifty IS people devotes a few hours per week throughout the whole year to information planning. Among other things, the plan contains the vision and the list of priorities. It also includes information about slack resources -- some reserve money available to support good new ideas, for example.

The plan is usually not more than ten pages long. The information planning document is more of a working paper, a sort of draft to stimulate and support discussion rather than an authoritative formal document or blue-print which permits only marginal deviation in the implementation. The following example points to the contrast between the *bureaucratic* or official approach to information planning and the *actual* way in which successful IT champions behave. When asked the question about information planning, one champion turned in his chair and pointed to the 'several meters' of information systems planning

documentation lining his shelves. He then held up the three page document on his desk, the information plan that he actually uses.

3.4 Top-down Story, Bottom-up Experience

Perhaps one of the reasons that the myth of information planning as a completely top-down and orderly process is perpetuated is that the story that is told about new IT development is quite different from the actual experience. One champion cited the example of the actual evolution of his very successful IT product that had been particularly messy. Yet when the top executives presented the story to the public, they responded to expectations and presented it as an orderly, completely top-down, planned, structured, and step-by-step process.

4. Expecting the Unexpected

The final category of characteristics in this model follows from recognizing that the nature of information planning is iterative not linear. Rather than being surprised when the environment exerts an influence on IT, these champions expect it. The challenge, as they see it, is to apply creativity and flexibility to responding to these issues.

4.1 Creative Problem Solving

One noteworthy characteristic of these IT champions is their ability to develop creative answers to problems which confront them. One champion related his attempt to experiment

and learn from the adoption of new IT. He entrusted the job of technology adoption to a task force which was also responsible for working out informal organizational structures for using the new technology. Once it was clear that the structures worked, they were made formal and put back into the organization. This example demonstrates how the champion combined technical prototyping with organizational prototyping as a means of dealing with the unknowns associated with a new technology.

Another champion told how he got around the problem of introducing a new IT product to the general public. The company was reluctant to place a new system in the marketplace out of concern about legal exposures associated with providing incorrect information. Rather than delay product introduction until further testing was accomplished, however, the IT champion provided the following compromise. Why not offer the system free of charge to selected customers? In this way, the company would gain the benefit of early introduction of the product yet protect itself against legal problems with customers.

One champion in the financial sector came up with the idea of furnishing clients with an application to enable them to obtain data from any bank. The champion's attitude was that even if his company loses a client in the banking services area, it will gain a client in the information services area.

4.2 Flexible Decision Making

Some IT champions have a decision making style that tends to be more technology-driven

while others are more market-driven. In any case, while they are interacting with their clients to identify specific problems to be solved by the use of information technology, the champions are also constantly on the lookout for for new IT capabilities that can be relevant to their companies. An overall observation about the decision style of these champions is that it tends toward considering both problems and solutions at the same time and matching them as opposed to a more linear problem solving approach. A final comment about their decision style is that they rely on flexibility in seeking a balance between stability (or routinization or control) and innovation, or what Fischer (1994) calls the paradox of IT management. One champion noted:

One foot wears an army boot, you pay a lot of attention to stability. The other foot wears a ballet shoe, you look for opportunities, you change and switch.

4.3 Coping with the Environment

Churchman (1971) defines the environment as that which cannot be controlled by the system yet exerts an influence on it. Trauth, et al. (1991, pp. 33-34) have interpreted this for information systems to mean those features of the organizational and societal context which will influence the demand for and behavior of information systems . From the viewpoint of the IT champion, the environment means the realm of *unintended consequences*. These consequences can be both positive and negative. One champion noted the unintended consequence of a successful IT product which he introduced. Because people saw that it was a fantastic success, the attitude of the company towards information is changed. There is also

a more positive attitude towards innovation in information technology. What is noteworthy across all IT champions, however, is the conscious inclusion of environmental influences in their planning.

Conclusion

Howell and Higgins (1990) investigated the personality characteristics, leadership behaviours and influence tactics of champions of technological innovations who emerge spontaneously to promote innovation. We may call these individuals *informal champions*. Their results suggest that informal champions who successfully introduce innovation evidence the following behaviors. They have the capacity to articulate a compelling vision of the innovation's potential for the organization. They exhibit confidence in others' ability to participate effectively in the initiative. Finally, they display innovative actions in order to achieve goals. In contrast to the behavior of informal champions, all ten of the IT champions interviewed in this study behave in their capacity as *formal champions*. The findings of this study suggest that formal champions exhibit transformational leadership traits and behaviours in addition to employing the influence tactics used by the informal champions.

One of the biggest barriers to the acceptance of this alternative approach to information planning is based in perception. Bureaucratic information planning methods respond to managers' comfort level. It gives them the feeling that they are 'in control' of exploding information technology costs. In contrast, the more open, adaptive approach described in this paper may make managers feel that they have lost control. However, if the ultimate measure

of successful information planning is doing the business correctly, a strong case can be made for the benefits of innovation over bureaucracy.

TABLE 1: IT Champions & their Organizations

	Champion 1	Champion 2	Champion 3	Champion 4	Champion 5
Profile of IT champion					
Education background	university	university	higher technical school	university	PhD
Technical knowledge	courses, in the course of work	courses, in the course of work	in the course of work	courses, in the course of work	courses, in the course of work
Experience in IT field	20 years	9 years	17 years	5 years	21 years
Position	research director	project coordinator	MIS manager	project manager	director of automation
Report to	CEO	depends on job	Board of directors	MIS management	Board of directors
# people to direct	5 to 15	5 to 15 per project	55	6 to 10	direct 5, indirect 125
# projects managed	3	3	20	3	10
Company profile					
Branch	IT consultancy	transport	banking	Non-profit	Service
Size (people)	3500	27,500	465	1000	1500
Size (turnover) <i>US \$1 = Dutch Guilder (Hfl.) 1.9</i>	Hfl. 475 million	Hfl. 3 billion	Hfl. 9 billion (balance total, not turnover)	Hfl. 750 million	Hfl. 42 million
Importance of IT to company	moderate	strategic	strategic	strategic	strategic
Organizational experience in IT	15 years	10 years	20 years	30 years	28 years

	Champion 6	Champion 7	Champion 8	Champion 9	Champion 10
Profile of IT champion					
Education background	PhD	university	Ph D	university	high school
Technical knowledge	in the course of work	formal training	in the course of work	in the course of work	in the course of work
Experience in IT field	n.a.	8	25	25	25
Position	Director corporate planning and development	project manager	chief information officer	member of the board	head of organization and information
Report to	Board of directors	IS Manager	Board of Directors	Board of Directors	managing director
# people to direct	3	20	35	1000 - 1100	70
# projects managed	3	8	many	more than 20	4
Company profile					
Branch	Retail	government	transport	banking	transport
Size (people)	3200	120	27,500	1600	27,500
Size (turnover)	Hfl. 99 million	n.a.	Hfl. 3 billion	Hfl. 24 billion (balance total)	Hfl. 3 billion
Importance of IT to company	strategic	strategic	strategic	strategic	strategic
Organizational experience in IT	15 years	11	10 years	20 -25	10 years

Acknowledgement: The authors would like to thank our student assistant, Remo van Rest for his help with the research.

References

- Allen, T.J. and Cohen, S.I. 1969. Information flow in research and development laboratories. *Administrative Science Quarterly*, Volume 14, pp. 12-20
- Beath, C.M. 1991. Supporting the Information Technology Champion. *MIS Quarterly*, September.
- Curley, K.F. and Gremillion, L.L. 1983. The Role of the Champion in DSS Implementation. *Information & Management*, Volume 6, Number 4, pp. 203-209.
- Ettlie, J.E., Bridges, W.P. and O'Keefe, R.D. 1984. Organization strategy and structure differences for radical versus incremental innovation. *Management Science*, Volume 30, pp. 682-695.
- Fischer, S.J. 1994. *The Paradox of Information Technology Management*. Amsterdam: Thesis Publishers.
- Fischer, S.J. and Heng, M.S.H. 1994. *A Critical Study of Information Systems Strategy Formulation*. Research Memo, Dept of Information Systems, Vrije Universiteit Amsterdam. (forthcoming)
- Howell, J.M. and Higgins, C.A. 1990. Champions of technological innovation. *Administrative Science Quarterly*, Volume 35, Number 2, pp. 317-341.
- Kanter, R.M. 1983. *The change masters*. New York: Simon and Schuster.
- Lederer, A.L. and Sethi, V. 1988. Implementation of strategic IS planning methodologies. *MIS Quarterly*, Volume 12, Number 3, September, pp. 445-461.
- Mischel, W. 1973. Towards a cognitive social learning reconceptualization of personality. *Psychological Review*, Volume 80, Number 3, pp. 252-283.
- Perker, J.E.S. 1974. *The Economics of Innovation*. London: Longman
- Peters, T.J. and Waterman, R.H. 1982. *In Search of Excellence*. New York: Harper & Row.
- Roberts, E.B. 1968. A basic study of innovators: how to keep and capitalize on their talents. *Research Management*, Volume 11, Number 4, pp. 249-266.

- Rothwell, R. et al, 1974. SAPPHO Updated - project SAPPHO phase II. *Research Policy*, Volume 3, pp. 258-291.
- Runge, D. & Earl, M.J. 1988. Gaining competitive advantage from telecommunications. In Earl, M.J. (ed.), *Information Management*. Oxford: Clarendon Press.
- Schon, D.A. 1963. Champions for radical new innovation. *Harvard Business Review*, Volume 41, March-April, pp. 78-86.
- Trauth, E.M. 1979. *An Adaptive Model of Information Policy*. Ph.D. Dissertation, University of Pittsburgh.
- Trauth, E.M., Kahn, B.K. and Warden, F. 1991. *Information Literacy: An Introduction to Information Systems*. New York: MacMillan Publishers.
- Waema, T. and Walsham, G. 1990. Information Systems Strategy and Formulation. *Information and Management*, Volume 18, Number 1, pp. 29-39.

- 1993-1 W. Hassink
L. Broersma Labour demand and Job-to-Job Movement: Macro Consequences as a Result from Micro-economic Behaviour
- 1993-2 J. Barendregt Financial government policy, 1940-1990
- 1993-3 J. Barendregt Industriepolitiek. Honderd jaar overheidsbeleid in vogelvlucht
- 1993-4 S. Fischer
M. Doodeman
T. Vinig
J. Achterberg Boiling the frog or seducing the fox
Organizational aspects of implementing CASE-
technology
- 1993-5 G. Ridder
J.S. Cramer
P. Hopstaken Down to Ten: The Econometrics of the Red Card
- 1993-6 F.A.G. den Butter
J.A. Vijlbrief Labour Participation and Social Security in The Netherlands; Reconstructing the welfare state
- 1993-7 F.A.G. den Butter
J.H. Abbring Dynamic labour market equilibria with heterogeneous unemployment
- 1993-8 F. Bruinsma
P. Rietveld Urban Agglomerations in European Infrastructure Networks
- 1993-9 F. Bruinsma
P. Rietveld Infrastructure and Metropolitan Development:
a European Comparison
- 1993-10 J.H. Abbring
J.C. van Ours Selling News and Advertising Space; The Economics of Dutch Newspapers
- 1993-11 Ralf Peeters On a Riemannian Version of the Levenberg-Marquardt Algorithm
- 1993-12 Ralf Peeters Application of the Riemannian Levenberg-Marquardt Algorithm to Off-line System Identification
- 1993-13 Bernard Hanzon A new balanced canonical form for stable multivariable systems
- 1993-14 G.J. v.d. Berg
M. Lindeboom
G. Ridder Attrition in Longitudinal panel data, and the Empirical analysis of dynamic labour market behaviour
- 1993-15 Harold Houba An Alternative Proof of Uniqueness in Non-Cooperative Bargaining
- 1993-16 G.J. v.d. Berg Wage Dispersion and Mobility
- 1993-17 F.A.G. den Butter Labour Participation and the Flow Approach: An empirical analysis for The Netherlands
- 1993-18 F. Bruinsma
P. Rietveld Accessibility of Cities in European Infrastructure Networks;
A comparison of approaches