Understanding the Use of IT Evaluation Methods in Organisations

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Abstract

This thesis explores the apparent paradox of information technology (IT) evaluation methods not being broadly employed despite their seemingly innate qualities of assisting organisations in improving their management of IT costs and benefits. This is paradoxical since a multitude of evaluation methods exist and both academic and professional literature argue that their use will lead to beneficial effects.

The thesis aims to deepen understanding of the employment process of IT evaluation methods in organisations. Building on diffusion theory and actor-network theory (ANT), it is an in-depth case study of the employment process of an IT evaluation method at a Dutch insurance company. The diffusion theory is a good initial candidate for understanding the phenomenon of underutilisation, but fails to unravel the paradox. An ANT analysis suggests that during a process of *mutual translation* both the evaluation method and its surrounding actors enter into a dynamic negotiation mutually translating each other. The evaluation method is appropriated by its surrounding actors in a black-boxing attempt. These actors capitalise on weaknesses in the method's inscriptions, increase their strength and follow anti-programs. The method also appropriates these surrounding actors, assigning them new roles (changing their work processes, responsibilities and prerogatives) and moving them to new positions in the actor-network. The resulting employment process has emergent properties and is characterised by improvisation rather than blue-print planning. When employed, the method is unlikely to resemble its initially planned outcome.

The origin of the paradox is based on the assumptions that evaluation methods are neutral and have innate qualities and that their employment proceeds according to planned outcomes. This thesis undermines the paradox by arguing that a limited understanding of evaluation methods and unrealistic assumptions about evaluation employment are why such methods do not manifest their expected employment.

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List of Acronyms and Abbreviations

ABM	Activity-Based Management
CEO	Chief Executive Officer
COPAFIT	Commercial, Organisational, Personnel, Administrative, Financial, Informational and Technical aspects of a project
CRM	Customer Relationship Management
EB	Employee Benefits
EDI	Electronic Data Interchange
ERP	Enterprise Resource Planning
FGU	Financial Group United
GOTIK	Dutch acronym for: Geld (money), Organisatie (organisation), Tijd (time), Informatie (information), Kwaliteit (Quality) aspects of a project
IFIP	International Federation for Information Processing
IIC	International Insurance Company
IRR	Internal Rate of Return
IS	Information System
IT	Information Technology
ITEM	IT Evaluation Method
JIT	Just In Time
NPV	Net Present Value
PCM	Project Control Method
PCT	Project Characteristics Template
PM	Department of Program Management
ROI	Return On Investment
SD	Department of System Development
SDM	System Development Methodology
SPS	Department of System Process Support
TQM	Total Quality Management
Y2K	Problems associated with the changing of the millennium ('the year 2000 millennium bug')

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Chapter 1: The Paradox of Utilisation of IT Evaluation Methods in Organisations

1.1 INTRODUCTION AND BACKGROUND

This research attempts to develop an understanding of the employment process of information technology (IT) evaluation methods in organisations. Since the widespread application of computerised systems in business, organisations have been struggling to improve how they manage their IT from a cost / benefit perspective. This struggle continues despite the fact that numerous researchers over the last decades have provided various methods, concepts and approaches to assist organisations in improving their grip on IT costs and benefits[1]. Surprisingly, the dissatisfaction with managing the contribution of information systems (IS) to organisations has not led to the expected use of formal IT evaluation methods which specifically take into account the IT characteristics such as intangible benefits and IT investment risks. This paradox is central to this thesis.

Our analysis is based on the premise that a deeper understanding of the *process* of IT evaluation method employment is needed to gain insight into how organisations employ an IT evaluation method to improve their IT cost / benefit management. Understanding this *process* of employment is, at the very least, as important to the improvement of IT cost / benefit management as is understanding the characteristics (i.e. *content*, such as the criteria) such a method requires to be successful in achieving its goals. The characteristics of IT evaluation methods are a topic that is widely discussed from various theoretical perspectives in the existing literature relating to IT evaluations. However, the matter of how to incorporate such a method in an organisation remains largely unexplored in the field of academic research.

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[1] In this thesis, IT evaluation methods are interpreted quite broadly as to point to any evaluation method, methodology, concept or approach designed to (economically) assess the costs and benefits of IT or an information system. An IT evaluation method could therefore also be read as IS / IT evaluation methodology, concept or approach. Thus, the use of 'IT' in this thesis can be seen to denote both hardware, software and related technical routines (commonly referred to as IT), as well as the organisational applications, increasingly based on information technology, that deliver the information needs of an organisation's stakeholders (commonly referred to as IS) (Willcocks and Lester 1999b).

In this chapter we will give a brief overview of the need and justification for this research. We will also touch on some relevant topics in order to establish the background for the research questions. These topics will be discussed further in the following chapters.

1.1.1 Management of IT costs and benefits: an issue of growing importance

With the increase of expenditure in IT, the topic of IT evaluation continues to be an important issue in the management of IS. Statistics in the Netherlands show that in 1999 expenditures relating to IT in businesses and government were estimated at over € 12 billion, an increase of almost 17% compared to 1997 (CBS 1999). Comparable growth figures have been reported in other developed countries (Willcocks and Lester 1999a), and throughout the last decade. Moreover, a large portion of IT costs can be seen as wasted due to the failure of IT projects (i.e. projects that are aborted or fail to deliver their expected benefits). An estimate by Berghout (2002) shows that approximately € 4 billion of the total € 23 billion in Dutch IT expenditures[2] are wasted by such failures on an annual basis.

With growing IT costs, the notorious reputation of costly IT failures, together with the notion that IT has become a critical component of business, senior managers seek evidence verifying the contribution of IT to the success of the business (Thorp 1998). The desire for this evidence is strengthened by current fears of economic recession in many Western countries, driving the need for justification of the high IT costs.

Since the introduction of computers in organisations, there have been considerable developments in IT, allowing for new applications to be made available. These new applications have significantly impacted the way in which organisations use IT. More than just supporting functional processes, IT has been increasingly applied to the cores of businesses (Scott Morton and Rockart 1984). Farbey, Land *et al.* (1993) note three distinct phases in IT that have manifested during the last few decades. The first phase started when IT was applied to functional areas. It brought efficiency and

[2] The approximation of € 23 billion includes expenditures on computers, computer services, telecommunication services and embedded systems in technical products.

effectiveness benefits. For example, automating the payroll reduced staff costs and automating stock control provided better information on stockouts and deliveries. In the second phase, IT became part of the individual workplace in organisations and was typified by the benefits associated with using microcomputers (e.g. word processing brought improvement to office workers). The third and present phase shows IT being associated with transformations and effecting the whole organisation in its business processes, services and products. A more detailed account of the changes effecting IT evaluation is given in section 3.2.3.

With organisations becoming increasingly dependent on IT (Earl 1989), management of IT has become more crucial through the years. Steadily rising IT costs and higher expectations with regard to the benefits associated with IT have increased the need for understanding the costs and benefits related to IT.

As IT was generally accepted as being more strategically important to organisations, it demanded large sums of capital and it proved to be much harder to determine the exact value of it. These difficulties started with the growing awareness that the economic management of IT no longer concerned management of *costs*, but rather the management of *investments* concerning high future costs and benefits. Though the term *economics* is commonly associated with money or other financial means, an economic perspective in this thesis relates to an allocation of any scarce resource (including financial means, IT capacity, etc.) to obtain certain goals. The change in economic management from *costs* to *investments* means a shift in staff involved in organisational IT (Galliers 1991a): from programmers and IT managers to IS business directors and members of the board of directors. Moreover, considering IT expenditures as investments broadens the scope of IT evaluation: it no longer is confined within the boundaries of an IT project but spans the complete life cycle of the information system. A life cycle from birth to death of the system, which starts with just an idea, which continues as IT project when drawn up, the creation and implementation of the system itself, moves on to using the system in practice and concludes with dismissing the related information system after it has become obsolete (Swinkels 1997).

The issue of IT evaluation as an important topic both for managers and for researchers is not new. Keen (1991, p.11) stated at the beginning of the nineties: "Many senior managers feel caught in a trap. They feel that their firm cannot afford not to invest in IT, for many reasons of competitive necessity; but they also think that they cannot afford to invest without clearer evidence of its impact on financial performance." He argues that senior managers lack a well-established management process for taking charge of IT. Farbey, Land *et al.* (1993, p. 4) stated that "for the past three decades managers have expressed concerns about the value they are getting from IT investments, and for the past three decades they have been searching for an ideal way of solving the problems. [...] The problem of finding convincing methods of justifying expenditure on information systems appeared high on [...] the list [of critical management issues]." A recently published journal for senior executives states on the topic: "[Today] it is hard to pick up an IT-oriented publication that does not devote lots of ink (or pixels) to cost /benefit analysis and justification for investments. [...] We have seen it before. Recessions from 1970 on have brought forth lots of methodical approaches to IT cost-justification" (Clermont 2002). It is debatable whether such a development is strictly related to economic recession. Van Eekeren and Nijland (2003) argue that IT cost / benefit management continues to be a topic of concern for organisational managers, irrespective of the economic climate. They note that in an economic depression cost-justification might receive more attention, but in economic better times, managers still face the task of proving insight into the potential benefits of IT investments and allocating scarce resources to them – with IT capacity rather than financial means as the scare resource.

In academic research, the International Federation for Information Processing (IFIP) held its first conference on the Economics of Informatics in 1961. Today, in the editorial of the special issue on information systems evaluation from the Information Systems Journal October 2002, it is said that "the number of papers submitted was among the highest for any Information Systems Journal call" (Irani and Fitzgerald 2002, p. 263).

In sum, we can conclude a growing importance of economic management of IT and inherently connected to it, the topic of IT evaluation. The importance is noted both in organisational practice as well as in academic research.

1.1.2 Problems in evaluating IT

The literature suggests that organisational managers as well as IS professionals recognise IT evaluation to be one of the important unresolved concerns in information management (e.g. Farbey, Land *et al.* 1993; Grembergen and Bloemen 1997). Evaluation of IT investments is problematic not only because of the inherent difficulties of evaluation (such as making estimates for future situations), but also due to typical characteristics of such investments in comparison with other investments (Ballantine, Galliers *et al.* 1995). IT projects typically have numerous intangible costs and benefits, and they have a significant impact on many aspects within the organisation. These projects remain innovative and often involve (non-proven) technology. Moreover, IT investments have a shorter life cycle due to continuous technology development. Whether IT projects really are different from other business projects remains a topic of debate (see the discussion in section 3.2.4), but clearly IT projects pose several difficulties in managing them from a cost / benefit perspective.

The main problem is being able to quantify the benefits of an IT investment. Difficulties in such quantifications correlate directly with the evolution in IT applications. Whereas IT investments used to be financially justified by determining the improvement in efficiency gains (e.g. the time and money saved by automating manual labour), the nature of IT investments has dramatically changed over the last two decades (Clemons 1991; Ballantine, Galliers *et al.* 1995; Reeken 1997). Farbey, Land *et al.* (1993) note that today "besides *efficiency*, IT has the potential to provide wide benefits, including: competitive advantage, co-operative advantage, diversification, marketing and effective management" (ibid, p. 7). Current IT investments have become focused on improvements in organisational *effectiveness*. The objective of effectiveness projects is not simply to reduce costs of existing tasks, but to do tasks differently to better achieve the desired results (Fitzgerald 1998). The justification for these projects must be based on effectiveness *criteria* such as increased functionality, product quality and enhanced competitive advantage. The

strategic benefits of IT investments, such as quality improvement, cost avoidance and risks reduction are difficult to assess and inherently hard to quantify. Furthermore, the actual organisational benefits of an IT investment depend on the secondary effects that occur due to changes that were initiated by the investment. For example, the increased number of customers of an organisation (secondary benefit) due to an investment in better quality products (primary benefit) is dependent on the effect that the customers acknowledge the quality improvement to be worthwhile. This not only results in benefits occurring at some distant point in the future, but also makes it harder to link acquired benefits directly to the specific IT investment. Similarly, investments in IT infrastructure will only prove profitable if the infrastructure is exploited in an effective manner (Renkema 1998; Renkema 2000). Because of the difficulty in financially estimating effectiveness criteria and the indirect secondary effects, these benefits are said to be intangible.

At first glance costs, as opposed to benefits, seem to pose little problem with respect to quantification since they are measurable the moment they occur. However, so-called 'hidden costs' contribute to the problematic nature of IT investments (Keen 1991; Looijen and Vorst 1998). These include background IT management costs, the costs of end-users helping each other solve IT related problems and the costs of downtime in the case of IT failure (Maanen 2000a). Moreover, (visible) IT costs are administered very differently at each individual organisation, making it very difficult to obtain a clear view of the actual costs related to IT. For example, often 30% to 40% of IT expenditures is allocated outside the formal IT budget (Keen 1991; Willcocks 1996b). There seems to be no generally accepted accounting norms for administrating IT expenses (Davamanirajan, Mukhopadhyay *et al.* 2002).

Moreover, not only the quantification of benefits and costs but also their identification is a problem frequently related to IT investments (Ballantine, Galliers *et al.* 1999). One of the most common deficiencies is not the determination of a poor cost / benefit figure, but rather the complete omission of important costs and benefits (Page and Hooper 1987). Likewise, unanticipated benefits, which can only be assessed retrospectively, can have a greater impact than the anticipated ones (Farbey, Land *et al.* 1999b).

Further problems with IT evaluation are related to the difficulties of IT project-risk assessment and uncertainty of investment results. The fact that IT investments have organisational impacts which are hard to quantify coupled with the fact that evaluation is intrinsically subjective, based on individual value judgements (including political considerations), contribute to the ambiguity surrounding IT evaluation. As a result, systems do not have clear definitions for 'success' and 'failure'. In addition, investment objectives might change over time due to evolving user requirements (Keen and Scott Morton 1978). These aspects make a viable comparison between prior expectations and final outcomes very difficult.

To address these IT evaluation problems, numerous methods and techniques have been developed in the past to aid organisations in managing and controlling IT costs and benefits (Wolfsen and Lobry 1998). However, in practice few of these methods are used (Yan Tam 1992; Bacon 1992; Willcocks 1996a; Ballantine and Stray 1998).

1.1.3 The productivity paradox

The productivity paradox is typically illustrated by a quote from economist Robert Solow who wrote (Solow 1987): "You can see the computer age everywhere but in the productivity statistics." Solow's assertion counters the common assumption that computerisation would directly and dramatically improve productivity. The debate about if and how IT increases (macro-economic or organisational) productivity is typified by the term 'information paradox' or 'productivity paradox'. Economists have long argued about the relationship between computerisation and productivity growth. Many believed that technological innovation was a major factor in national productivity and assumed that investments in information technology would be reflected in national statistics when the cumulative capital stock of computer systems was large enough. Thus, they would result in improved productivity statistics (Kling 1999). But from the early seventies onward productivity has shown a much slower growth than in previous years in countries with high IT investments. Ironically, this was seen as the time when IT was thought to be the most innovative technology that would be responsible for 'technological progress' and would make just as big a contribution to productivity growth in later as in earlier years (Landauer 1995). Technological progress made in earlier years includes, for example, inventions like

the steam engine (1765-1810) and the manufacture of steel, railroads, textiles (1865 – 1910), electricity generators (1880 – 1925), automobiles (1900-1945), aeroplanes and other technological innovations (1935 – 1980).

Many researchers have insisted that IT does increase productivity (e.g. Brynjolfsson and Hitt 1998; Dewan and Kraemer 1998), but just as many have demonstrated the opposite (notably Strassmann 1985). Numerous reasons for the inability to show productivity growth because of the implementation of IT have been brought to light. For example, Brynjolfsson (1993) blames measurement errors, delayed benefits, the redistribution of organisational activities rather than the increase of organisational activities ("IT rearranges the shares of the pie without making it any bigger") and mismanagement due to the lack of explicit measurements of the value of information (e.g. management being overwhelmed rather than helped by more information).

The productivity paradox remains a topic of debate. However, it can be concluded that the debate itself gives us reason to believe that current strategies of computerisation do not readily produce expected economic and social benefits in a vast number of cases and that technology alone, even good technology, is not sufficient to create social or economic value (Kling 1999). The debate on the productivity paradox stimulates the search for better ways of IT evaluation and our understanding of such evaluation itself (Willcocks and Lester 1999c), both in research and in practice. It increases the quest for (*ex post*) evaluation to determine in retrospect what the contribution of IT has been, but also beforehand (*ex ante*) evaluation, to assess if potential IT investments will be able to deliver benefits.

1.1.4 IT evaluation and its usage

A vast majority of IT evaluation literature is devoted to the evaluation of IT investments, mainly discussing different methods to address the intangible benefits of the investments using various criteria for evaluation. Wolfsen and Lobry (1998) give a good overview of some of the techniques and methods developed for this purpose. Considering over 65 methods for IT evaluation, Renkema and Berghout (1997b) conclude that the available non-financial evaluation methods are hardly supported by theory. Furthermore, the methods focus on the evaluation criteria rather than the evaluation process by which the evaluation takes place.

Despite the long list of enhanced methods especially geared to evaluating IT, research (Yan Tam 1992, Willcocks 1996a, Ballantine and Stray 1998, Bacon 1992) shows that the traditional discounted cash flow appraisal techniques, such as *cost benefit analysis*, *payback time* and *return on investment* still dominate IT evaluation. These general methods do not account specifically for IT characteristics. Moreover, although they are widely used, they are not always trusted (Farbey, Land *et al.* 1993) or considered an important factor in decision-making by the organisations that use them (Ballantine and Stray 1998). This seems to suggest that frequently these techniques are being used in a more ritualistic manner – for example, as a means to gain project approval – rather than contributing directly to the evaluation purposes.

Hochstrasser (1994) concludes from his research that only 16 percent of companies use rigorous methods to evaluate and prioritise their IT investments. Kumar (1990) shows in his research that only 30 percent of the organisations perform a post-implementation evaluation on a majority (75 percent or more) of their information systems.

Despite the huge variety of evaluation methods especially constructed for a large number of goals, uses and organisational contexts, their actual use falls short of what one would expect. It is unlikely that this lack is to blame on evaluation methods not addressing the right characteristics (e.g. technical or economic criteria) for IT investments. Still, many new evaluation methods are being developed to improve certain characteristics, displaying minor revisions of already developed – but unused – methods. Such developments still are justified by a reaction to conventional investment appraisal methods since "these [traditional] methods simply do not work in today's sophisticated technology-led environments" (Irani and Love 2001). Such arguments however seem to ignore the abundance of more advanced evaluation methods already available.

More radically, the failure to employ IT evaluation methods as seen in practice can perhaps be explained by the failure of the methods to consider necessary *sociological* elements of evaluation, such as taking into account the value-pluralism of stakeholders on the subject of evaluation (Guba and Lincoln 1989). Clearly, such an

interpretive perspective offers a major contribution to traditional evaluation practices. However, findings from Serafeimidis and Smithson (1995a) support the hypothesis that the adoption of a method is not automatically solved by applying a different type of IT evaluation methodology. They found in their introduction of an interpretive IT evaluation methodology at an insurance organisation in the UK that the method only achieved a limited level of success and in the end it fell into disuse (Serafeimidis and Smithson 2000).

1.2 RESEARCH BACKGROUND AND RESEARCH QUESTION

1.2.1 Background of the research

To summarise the above, we notice that organisations attempting to employ IT evaluation methods do so to improve IT cost / benefit management, a topic high on the agenda of business managers and executives. There are many studies and suggestions about what constitutes a successful approach to IT evaluation, but research shows that in practice few of these approaches are used. The majority of evaluations is performed using capital investment appraisal techniques, such as cost-benefit analysis, payback and return on investment. There are many arguments against using (exclusively) these techniques for IT evaluation, primarily because only financial aspects of IT are considered which form just a small portion of the real impact of IT investments.

Organisations are aware of these shortcomings in their evaluation of IT, and they demonstrate a major interest in this topic, as discussed in section 1.1.1. However, despite the existence of various approaches to address such shortcomings, recent studies have shown that in general little has been done by organisations to adopt such approaches. Studies performed in 1997 (Ballantine and Stray 1998) show the same results as studies performed in 1992 (Bacon 1992, Yan Tam 1992): organisations still mainly use (simplistic) financial techniques for IT evaluation. Ballantine and Stray (1998) surmise that this trend of using financial techniques for IT evaluation is likely to continue, contrary to their inappropriateness to the task of IT evaluation. They contend that "more research needs to be undertaken, to ascertain what barriers, if any, discourage [more sophisticated techniques'] use, so as to avoid potentially useful techniques being dismissed as inappropriate" (ibid, p. 13).

The noticed interest from organisations in better IT cost / benefit management (reinforced by the great attendance by managers to IT cost / benefit seminars and the abundance of publications on evaluating IT investments in both business journals and academic publications – see section 1.1.1) stands in contrast with the lack of use of evaluation methods that address the shortcomings in their management of IT costs and benefits. It can therefore be hypothesised that the introduction of advanced IT evaluation methods does not automatically happen simply by their existence.

1.2.2 Research purpose and question

The purpose of this research is to develop an understanding of the employment *process* of IT evaluation methods in organisations. It is hypothesised that organisational (social and political) changes have to take place for IT evaluation practices to be employed. The aim of the research is not (in the first place) to understand the characteristics of a 'successful' IT cost / benefit management, an area of research which already has received considerable attention, but to understand how the *process* of employment of IT evaluation methods occurs. Though we do not deny the importance of developing IT evaluation methods that better support IT cost / benefit improvement, there is still a considerable gap between *having* sophisticated IT evaluation methods and actually *employing* them. It is argued that this gap needs to be bridged if difficulties in IT cost / benefit management are to be addressed.

Powell (1999) asserts that there are investment evaluation techniques which have been successfully employed in other fields of application (such as in engineering, various social projects and research and development). He argues that IT investments should be evaluated in a similar rigorous manner, but "getting organisations to apply and stick with techniques, rather than their existence, may be the more critical issue" (ibid, p. 163). To understand how organisations 'apply and stick' with such techniques is the central aim of this research. It can be viewed as building on the topic of changes introduced by an IT evaluation practice, and to deepen the understanding of its employment. Thus, the topic is organisational change and understanding the dynamics involved in employing IT evaluation methods.

The research question is: "Why do organisations generally seem to be unsuccessful in employing IT evaluation methods that help them in clarifying costs and benefits of IT, even when they express the need for more insight into the costs and benefits of IT?"

Some words on the clarification regarding the use of "costs and benefits", "unsuccessful" and "employing" in the research question. Firstly, costs and benefits do not necessarily have to denote quantifiable financial terms, but can also incorporate (negative and positive) qualitative aspects. Secondly, the difference between success and failure can be classified by *intent* or *result* (based on Nagel 1990). In terms of *intent*, the employment process is successful if it achieves its intended goals and a failure if it does not. In terms of *result*, the employment is successful if its resulting benefits minus its costs are maximised or at least positive, regardless of whether the benefits or costs were intended. Both intent and result can be determined quantitatively by measurement or qualitatively by assessing the desirability of the results.

Note however that this understanding of the success or failure of an employment process is very much dependent on the individual that assesses the success of the employment. Different people will have different interpretations regarding the success or failure of a certain case, an opinion which also may differ over time (Wilson and Howcroft 2002). Kanellis, Lycett *et al.* (1998) argue that there can be no single account of success, but only different perceptions influenced by context. The importance of their proposed interpretive approach to assess the success of an information system, they argue, is not in the final result but in the *process* itself, which allows intelligent consideration as to *why* aspects of an outcome (in their case: the information system, in our case: the employed evaluation method) may or may not be perceived as a success. This process induces awareness to change and might stimulate corrective action. Moreover, in most cases the employment of evaluation methods will only be partial 'successes' or 'failures' (Mitev 2000). When considering the success or failure of employing evaluation methods, we distinguish between failure to employ (in the sense of the method not being employed) and failure to deliver the expected effects of the method (unsatisfactory effects of the

method). In this thesis, we will address both meanings and see that both are very much interlinked.

Thirdly, notice that we use the term 'employment' rather than (arguably the more obvious) term 'adoption'. The reason for this is that adoption has strong connotations associated with the diffusion and adoption theory by Rogers (1995). Although this theory is part of our research, we would like to refrain from connecting ourselves beforehand too strongly to this theory, since we will also employ actor-network theory, which has a different vocabulary. In this thesis, employment means the 'initial uptake and continuous use' of an IT evaluation method by an organisation.

1.3 STRUCTURE OF THE THESIS

This thesis is organised into 8 chapters. Chapter 2 explores our research methodology. It discusses a number of research paradigms and theoretical streams influential in IS research. Adhering to a constructivist position, the thesis describes an interpretive approach to this research and details the selection of a case study.

Chapter 3 presents an overview of the literature on evaluation, in particular IT evaluation and findings regarding its employment. Moreover, it highlights important views on the phenomenon of organisations. This gives a broad perspective on the topics of concern for this study.

Building on the previous chapters, Chapter 4 is devoted to describing the theoretical frameworks that guide the analysis of the research. Two distinct theoretical approaches that help to understand the employment process of IT evaluation methods are discussed: diffusion theory and actor-network theory. Their contributions and limitations are presented.

Chapter 5 contains the empirical data central to this research. It starts by showing the organisational context of the case. This is followed by a description of the case organisation. The heart of the chapter is devoted to describing the events regarding the employment of an IT evaluation method at the selected organisation.

The findings from the case study are analysed in Chapter 6. Firstly, the case is analysed by using the diffusion theory, which though insightful cannot fully explain some of the elements in the case study in the case study. An actor-network theory discussion is then presented, giving a better understanding of the events at the case study.

Chapter 7 addresses specifically the research question and its inherent paradox. Building on the case study from Chapter 5 and the analysis of Chapter 6, it relates the findings to a new understanding of evaluation and its employment process.

Lastly, Chapter 8 concludes the thesis. After giving an overview of the complete research process, the contributions of the research are presented. A discussion of its limitations and implications for further research conclude the thesis.

Chapter 2: Research Methodology and Case Selection

2.1 INTRODUCTION

This chapter discusses the choice of research methodology. All research is based on some underlying assumptions or beliefs about what constitutes 'valid' research, what the 'underlying nature of phenomena' are and which research methods are appropriate (i.e. generate valid evidence). In order to conduct (or evaluate) research, it is important to be aware of these often hidden and implicit assumptions. Researchers therefore should be explicit about the philosophical assumptions underlying their research (Orlikowski and Baroudi 1991). This chapter presents a number of dominant research paradigms in IS research and subsequently explains the philosophical assumptions which are adhered to throughout this thesis. These paradigms will reappear throughout this thesis, showing themselves to be influential in both the field of research (e.g. visible in Chapters 3 en 4) and in daily life (e.g. visible in the case study described in Chapter 5 and analysed in Chapter 6).

Acknowledging the social character of the research and the phenomenon under study, this chapter further elaborates on various beliefs about the social versus the technical. Based on the philosophical foundations, we believe an interpretive approach is appropriate for our research and a case study strategy appropriate as research method. We describe how we conduct our research and how we have selected our case study. Finally, we discuss the background of the researcher, hopefully giving the reader more insight into the way this research has been conducted and ultimately lead to the results presented here.

2.2 RESEARCH PARADIGMS AND THEORETICAL APPROACHES

2.2.1 Introduction

In this section we discuss three sets of assumptions: the conventional, constructivist and critical paradigms. We start out by contrasting the first two. The selection of

these particular paradigms is based on their contrasting views and their influence on different streams of research, especially IS research.

We use the conventional, constructivist and critical paradigms only to the extent that it allows us to position our research. Specifically, the first two paradigms are a means of contrasting two diverging research approaches while the last, the critical paradigm, is more adjacent to a constructivist paradigm but holds some perspectives that are beneficial to this thesis.

2.2.2 Philosophical assumptions

Philosophers ask themselves the following three types of questions when trying to understand how we come to know what we know (Guba and Lincoln 1989, p. 83):

1. The ontological question: What is there that can be known? What is the nature of reality? What is truth?
2. The epistemological question: What is the relationship between the knower and the known (or the knowable)? What kind of knowledge can be obtained and what are the limits of knowledge?
3. The methodological question: What are the ways of finding out knowledge? How can we go about finding out things?

Ontology is concerned with the beliefs about *physical and social reality, existence* or *being*. Ontological beliefs have to do with the *essence of phenomena* under investigation, beliefs about *human rationality* and beliefs about *social relations* (Orlikowski and Baroudi 1991). Are the empirical world and its phenomena assumed to be objective and therefore independent of humans, or inherently subjective and hence existing only through the actions of humans in creating and recreating it? What intentions are ascribed to the humans studied? For example, in the discipline of economics humans are believed to act out of utility-maximising under limited access to information. How do people socially interact in organisations, groups and society? Social interactions may be viewed as inherently stable or orderly, or by contrast, primarily dynamic and conflictive.

Epistemology is concerned with the beliefs about the origin, nature and limits of *human knowledge*. Which criteria need to be met to construct or evaluate

knowledge? Common epistemological stances are a *positivist* world view, an *interpretive* perspective and a *critical* view. A positivist research perspective, which regards scientific knowledge as consisting of regularities, causal laws and explanations of an objective world (Ivari 1991), is dominant in Western science and in life in general, including in information systems research (Lyytinen and Klein 1985; Orlikowski and Baroudi 1991). Generally speaking, research is classified as positivist if there is evidence of formal propositions, quantifiable measures of variables, hypothesis testing and the drawing of inferences about a phenomenon from a representative sample to a stated population (Orlikowski and Baroudi 1991). Positivistic research has been critiqued to be inadequate and inappropriate in explaining the human, group, organisational and societal matters which surround information systems (Lee and Liebenau 1997; Susman and Evered 1978). Moreover, the search for universal laws is viewed to disregard historical and contextual conditions as potentially triggering events or influencing human action.

Interpretive and critical perspectives emphasise human interpretation and understanding as constituents in scientific knowledge (Ivari 1991). Knowledge is thus not obtained by employing natural and causal laws but through social discourse. These perspectives accuse the positivist world view of ignoring the fact that people think and act, and that people are active makers of their physical and social reality (Orlikowski and Baroudi 1991). Whereas in positivist social science, 'prejudice' or pre-judgement is seen as a source of bias and therefore a hindrance to true knowledge, interpretive and critical perspectives argue that knowledge and human interests are interwoven, and the researcher, being human, cannot be claimed value-free or unbiased (Klein and Meyers 1999). A critical view, considered from an interpretive view, stresses the importance of being aware of how common understandings and interpretations are taken for granted. It promotes having a conscious awareness about what interests assumptions that are taken for granted serve. Ultimately, its goal is an emancipatory one, to release people from intellectual and social domination (Lyytinen and Klein 1985). This entails, for example, critically testing the validity and soundness of arguments in the creation of knowledge (Lyytinen and Klein 1985).

Methodology is concerned with the research methods, approaches and techniques appropriate for gathering valid empirical evidence. It deals with the systems, rules and conduct of inquiry (Guba and Lincoln 1989). Research approaches commonly used in information systems research include laboratory experiments, field experiments, surveys various types of case studies, action research and simulations (Galliers 1991a).

There is no one choice with regard to these ontological, epistemological and methodological issues. The set of choices people make is the basic belief system or paradigm which is defined as "the most fundamental set of assumptions adopted by a professional community which allow them to share similar perceptions and engage in commonly practices" (Hirschheim and Klein 1989, p. 1201). By being explicit about the underlying assumptions of an employed paradigm, the researcher can become more aware of the assumptions and beliefs he or she brings to bear in his research. Each paradigm, while it helps to generate understanding, still has its own strengths and weaknesses. Applying different paradigms can also bring new and creative solutions and insights (Hirschheim and Klein 1989; Robey 1996; Benbasat and Weber 1996). Three diverging paradigms commonly adhered to in IS research are: the positivistic (or conventional), constructivist (or interpretive) and critical paradigm. These will be discussed below.

2.2.3 The conventional and constructivist paradigm

Guba and Lincoln (1989) argue that for many centuries the *conventional* (or *positivistic*, scientific[3]) paradigm has been the one to prevail. In contrast, there is the less widely accepted *constructivist* (or *interpretive*[4]) paradigm. Both are contrasted

[3] Other paradigms compatible with the conventional paradigm include the scientific and positivistic paradigms. In addition, links with respect to its objectivist nature can be made to the rationalist, functionalist, instrumentalist, structuralist and realist paradigms (Burrell and Morgan 1979). They all presume that positivistic assumptions are appropriate for sociology (Giddens 1979), though they differ in other respects (e.g. a researcher in the positivistic paradigm can epistemologically be seen to intervene in experiments, rather than be a completely exterior observer. However these paradigms share the notation that a researcher is more or less detached from the phenomenon under study, and has the ability to look from a (symbolic) distance what is going on - e.g. after the researcher has intervened. Functionalism holds the particular view that social phenomena can be explained by showing their function in the constitution and maintenance of social order (Scherer 2003). etc.).

[4] Other paradigms compatible with the constructivist paradigm include the *interpretive* and *hermeneutic* paradigms (Guba and Lincoln 1989, p. 39). Links to other paradigms with respect to the subjectivist nature of this paradigm include the *postmodern, nominalist, neohumanism, social constructivist, social shaping* and *critical paradigms* (Burrell and Morgan 1979; Knights and Murray 1994). Though these paradigms share a common (non-realist) ontology, they differ in other respects

by the three types of questions (ontological, epistemological and methodological) in Table 2.1. Notice that when the ontological posture is assumed, constraints are placed on the way in which epistemological questions can be answered[5]. For example, under the ontological assumption that an objective world exists, it is appropriate that the researcher assumes an objective distance from the phenomenon under study (i.e. with no or only very limited and controlled interaction), as to limit biases and prejudices. By contrast, under the assumption that reality consists of a series of mental constructions, the researcher is required to interact with the phenomenon and its context. So too, the answers to the methodological questions are dependent on both the ontological and epistemological assumptions. Some research approaches are more appropriate for certain assumptions than others (e.g. Galliers 1991a makes the distinction between *scientific* and *interpretivist* research approaches).

(e.g. an interpretive researcher is not always methodologically interested in coming to a joint construction of the case, but can also settle for multiple constructions from various perspectives. Moreover, there may be stronger and weaker versions of constructivism, for example, with regard to the multiplicity of reality. Interpretivism may acknowledge that a phenomenon may have different interpretations, whereas strong constructivism is inclined to argue that all phenomena have as many interpretations as there are interpreters – each having his/her own construction. Postmodernism stresses the concept of *local truths* defined by language games, rejecting any strive for unity and consensus. etc.). To acknowledge differences in similar paradigms (e.g. stronger and weaker versions of the same paradigm) falls within the constructivist's belief of dissimilarities in social constructs – paradigms are after all also social constructs. Thus, paradigms are not fixed, stable bodies of knowledge that can be drawn on unquestionably by researchers, since the (shared) construct frequently is revised – as can be seen historically, for example, by the positivistic paradigm that was shaped by different schools of researchers (Giddens 1979, p. 257) and, for instance, demonstrated by the different schools of functionalism (Scherer 2003). For a more in-depth and interesting discussion of differences between various paradigms, see Scherer 2003.

[5] Thus, when Walsham states that "interpretivism is [...] an epistemological position, concerned with approaches to the understanding of reality and asserting that all such knowledge is necessarily a social construction and thus subjective" (Walsham 1993, p. 5), it can equally be argued that interpretivism holds an ontological position (compatible to a relativist ontology). Ontologically it assumes that the social world is not 'given', but is produced and reproduced by humans through their action and interaction (Orlikowski and Baroudi 1991).

	CONVENTIONAL	CONSTRUCTIVIST
Ontology	A **realist** ontology asserts that there exists a single reality that is independent of any observer's interest in it and which operates according to immutable natural laws, many of which take cause-effect form. Truth is defined as that set of statements that is isomorphic to reality.	A **relativist** ontology asserts that there exist multiple socially constructed realities ungoverned by laws, causal or otherwise. "Truth" is defined as the best informed (amount and quality of information) and most sophisticated (power with which the information is understood and used) construction on which there is consensus (although there may be several constructions extant that simultaneously meet that criterion).
Epistemology	A **dualist objectivist** epistemology asserts that it is possible (indeed, mandatory) for an observer to exteriorise the phenomenon studied, remaining detached and distant from it (a state often called "subject-object dualism") and excluding any value consideration from influencing it.	A **monistic subjectivist** epistemology asserts that an inquirer and the inquired-into are interlocked in such a way that the findings of an investigation are the *literal creation* of the inquiry process. Note that this posture effectively destroys the classical ontological-epistemological distinction.
Methodology	An interventionist methodology strips context of its contaminating (confounding) influences (variables) so that the inquiry can converge on truth and explain nature as it really is and really works, leading to the capability to predict and to control.	A hermeneutic methodology involves a continuing dialectic of iteration, analysis, critique, reiteration, reanalysis and so on, leading to the emergence of a joint (among all the inquirers and respondents, or among etic and emic views[6]) construction of a case.

Table 2.1 The contrasting conventional and constructivist belief systems, copied from Guba and Lincoln (1989, p. 84, original emphasis)

The assumptions of both paradigms relate to different beliefs about the relationship between knowledge and the empirical world (Orlikowski and Baroudi 1991). That is, what researchers believe they are able to accomplish with their research work.

The ontological assumption characteristic of the conventional belief system is that there is a reality, in which things go on determined by certain laws, the root belief of which is called *determinism.* The existence of such driving laws leads the prime directive of research (or science) in this belief, namely to *predict* and to *control* (Guba and Lincoln 1989). Control requires phenomena be made to act in desired ways. For researchers and scientists adhering to the conventional paradigm, research is about discovering causal laws; general laws and antecedent conditions that cause a phenomenon to occur. Its basis for explanation is founded on a deductive-

[6] Etic research implies that the researcher adopts a more exogenic approach to the field, avoiding close involvement with participants and trying to stay clear of presenting all but objective assessments of the situation. An emic research holds a more endogenic perspective and stresses the reality as understood by the participants within (Prasad 1997).

nomological model (Scherer 2003), where deduction from universal laws brings certainty about the occurrence of a phenomenon. Realising that not all explanations of empirical events make use of deterministic laws, the conventional paradigm also makes use of statistical laws (inductive and deductive-statistical models of explanation). Prediction can be accomplished by relying on statistical-correlational bases, where the probability of antecedents or likeliness of the application of general laws to a phenomenon are taken into account.

By contrast, the constructivist belief is that there are multiple constructions of reality and its phenomena, devised by individuals as they attempt to make sense of their experiences. Entities in the world do not inherently have or give meaning on their own, but their meaning is ascribed by processes of interpretation. Social realities are not given as "hard facts", but rather have to be constructed and interpreted by the members of a social community (Scherer 2003). Such constructions usually are shared. This does not make them *more real*, but simply more *commonly assented to* (Guba and Lincoln 1989) that is, more commonly accepted. Shared meanings are thus a form of intersubjectivity rather than objectivity (Walsham 1993). These constructions might include some law-like attributions, but these are not natural laws that have been 'discovered'. Rather, it just might be useful for a variety of purposes to think sometimes in law-like terms. For example, it may be convenient to imagine that one can cause the lights to go on by flipping the switch, but that is not equivalent to arguing "that 'the cause of the light going on is the switch being flipped', as though that statement asserted something fundamental about nature. If there is no objective reality then there are no natural laws, and cause-effect attributions are simply that – mental imputations" (Guba and Lincoln 1989, p. 86). Rather than stating (conventionally) that every observed action (effect) has a cause and every cause has an effect, the constructivist assumption is that any observed action is the resolution of a large number of mutual, simultaneous shapers, each of which is constantly shaping and being shaped by all other shapers. There are no simple linear cause and effects. The purpose of research in this constructivist belief is aimed at producing (local) *understanding* (Klein and Meyers 1999) and *making sense* of the phenomenon under study. This entails the understanding of the studied phenomenon in its context, and the process whereby the phenomenon influences and is influenced by its context (Walsham 1993). Interpretive studies have the intent to understand the

deeper structure of a phenomenon, which it is believed can then be used to inform other settings (Orlikowski and Baroudi 1991). They are not intended to 'falsify' theories, but to develop theories as 'sensitising devices' to view the world in a certain way (Klein and Meyers 1999).

2.2.4 The critical paradigm

In comparing and contrasting paradigms, Burrell and Morgan (1979) note that not only can paradigms be classified along a 'objectivist-subjectivist' dimension, as was done above, but also by an 'order-conflict' dimension[7]. The 'order' or *unitary* view emphasises a social world characterised by unity, order, stability, integration, consensus and functional coordination. Social groups and organisations are viewed as being united under an umbrella of common goals and striving toward their achievement (Morgan 1986). It regards conflict as a rare and transient phenomenon, which can be removed through appropriate (managerial) action. By contrast, the 'conflict' or *pluralist* view stresses change, conflict, disintegration and coercion. The pluralist view emphasises the diversity of individual and group interests. Formal goals are just of passing interest to the social group and to organisations. It regards conflict as inherent and enduring and stresses the potentially positive or functional aspects of it.

The conventional paradigm is located on the unitary side of this spectrum. A paradigm that is typically located on the pluralist side is the critical paradigm. Ontologically speaking, it is compatible with the constructivist paradigm in that it adheres to the same premise that social reality is historically and socially constituted in human action and interaction. However, social reality is also understood to possess some global structural properties which tend to dominate human experience (Orlikowski and Baroudi 1991). Proponents of the critical paradigm assume that people can consciously act to change their social and economic conditions, but does however also recognise that human ability to improve their conditions is constrained

[7] Other researchers that have provided similar frameworks for classifying these paradigms also use the 'order-conflict' dimension. For example, Knights and Murray (1994) use this dimension, while on another dimension contrast the *global* and the *local* level of research. The *global* focuses on the systemic and structural factors (whether for example changes come from technological innovation or class and gender interests) and the *local* on the complexities and specificities of given cases.

by various forms of social, cultural and political domination as well as natural laws and resource limitations (Klein and Meyers 1999).

Moreover, the critical paradigm stresses the pluralist view in terms of social relations which are seen to be inherently conflicting. Whereas the constructivist view deals with questions about the subjective meanings actors are creating and adheres to a *status quo* of the social order, the critical view makes an attempt to uncover and deal with social conflicts and the distribution of power (Scherer 2003). The contradictions inherent in existing social forms lead to inequalities and conflicts, from which new social forms emerge (Orlikowski and Baroudi 1991). An important objective of critical research is "to create awareness and understanding of the various forms of social domination, so that people can act to eliminate them" (ibid, p. 19). By promoting emancipation, the critical paradigm purports that people can enhance the opportunities for realising human potential (Alvesson and Willmott 1992a).

Epistemologically, critical researchers argue that interpretation of the social world is needed, but not sufficient. In addition, the material conditions of domination need to be understood and *critiqued.* This leads methodologically to interpretive research methods that go beyond the self-understanding of participants and include critical analyses by means of particular theoretical frameworks. There are, however, no commonly agreed upon and accepted theories or explanations in this respect yet (Orlikowski and Baroudi 1991). In fact, empirical analytical methods normally associated with the conventional paradigm can be considered completely legitimate both in the study of natural and mathematical science as in the social sciences (Lyytinen and Klein 1985). The point is always to be critical about the methods employed and the suitability to the goals. The critical paradigm, on the other hand, tries to break open the exclusive validity of traditional scientific methods in order to include the hermeneutic methods as well. No matter which methods are chosen, the researcher should always be aware of their limitations and the validity as it relates to the research goals.

2.2.5 Theoretical approaches: the social and the technical

By acknowledging that the topic of our research has both social as well as technical aspects, we believe it is crucial to discuss the relationship (and dichotomy) between

the social and the technical in order to pinpoint our research approach. Different positions lead to different theoretical strands, a common occurrence in IS research. In this section we will discuss some of these relationships to better establish our research methodology.

Seen as two extreme forms, there are theories favouring *technological determinism* on the one hand and theories favouring *social determinism* on the other. In the former view, information systems are regarded primarily as technical systems with social consequences. Problems regarding IT are technically complex and can be solved by using sophisticated technical solutions (tools, methods, models and principles). In the latter view, information systems are believed to be social systems that are technically implemented. They serve as the agent for significant social interactions, which implies their connection to human communication through the medium of language (Hirschheim, Klein *et al.* 1995). IT thus is seen by its nature to be a social construction, since its existence depends on social institutions like language, the legitimacy and control of power, social influences and other norms of behaviour. In fact, it can be claimed from this perspective that all technological solutions are social solutions. Moreover, the design and management problems of IS are regarded as dealing primarily with social complexity and only secondarily with technological complexity. Yet, the mainstream literature continues to deal with information systems as a one-dimensional technological issue (ibid, p. 2).

This perspective on information systems brings to bear certain assumptions about what is social and what is technical. Different beliefs or theories on this include technological determinism, social shaping and social determinism, socio-technical theories and the social construction of technology. Relying on the views of Knights and Murray (1994), these theories, their underlying assumptions and the degree to which they relate to the above-mentioned paradigms will be discussed below.

Technological determinism

The primary concern of theories about organisational change based on technological determinism is to measure the correlation between organisational performance and organisational structure with regard to different production technologies. Such theories assume that the type of production technology largely determines

management performance, organisational structure and organisational behaviour, more so than (universal) administrative structures, interpersonal behaviour and leadership styles. For example, studies based on such theories demonstrate that the type of technology used largely determined the levels of conflict (Sayles 1958) and feelings of job dissatisfaction (Blauner 1964) in organisations.

Innovation theories based on technological determinism argue that technologies develop within paradigms and logic that reside within these technologies. The primary drive for technological progress and diffusion is considered technology, relatively independent of economic and social conditions (Nelson and Winter 1977). Ignoring the latter has been criticised as a major flaw in this aspect of determinism. Its tendency to neglect environmental and socio-political contexts has been widely criticised. For instance, the ten-fold increase in computer calculation speeds every five years is not inherently linked to some technological trajectory or natural law (often denoted as Moore's law, based on the paper by Moore 1965), but rather a self-fulfilling prophecy due to computer developers' beliefs in the necessity for achieving competitive advantage (MacKenzie 1990).

Despite criticisms, Knights and Murray (1994) argue that technological determinism still has a firm place in research, though often only implicitly. IT is attributed an inherent progressive role based on the supposedly innate qualities of the technology. For example, IT has been accorded with forces that automatically make enterprises more effective, flexible and adaptable; that make them less hierarchical and more democratic; that increase their learning capabilities and their productivity as well. Technological determinism seems naive in ascribing such an autonomous and independent role of "neutral" change agent to IT. As such, it has been criticised for ignoring the issues of power and politics in organisational change. Technological determinism typically adheres to a conventional paradigm.

Social shaping and social determinism

A reaction to the strong influence of technological determinism in technology studies is the social-shaping model. It stresses the human element within the technology itself. Physical objects constituting technology are meaningless outside of human activity and the knowledge associated with them. Technology and its development

are not seen as neutral and are therefore political to some extent. Far from shaping society, technology itself is shaped by the interests of powerful groups (e.g. scientific communities) or classes (e.g. capitalism), at least according to the proponents of the social-shaping model. The global context of broader cultural and socio-economic practices in society is considered paramount in mobilising support for particular technological decisions and strategies. For example, Carpenter and Feroz (2001) argue that in the context of American state governments all resistance to generally accepted accounting principles will ultimately fail. Not due the merits of the accounting techniques, but because of the potency of the institutional social pressures that result from the well-organised professional accounting in the governmental institutional field. On the far end, we find social determinism, which suggest all technological change is guided by an omnipotent and unseen hand that serves the capitalist or other interests. Technologies are perceived to be reified social relations. Through the medium of technological artefacts, domination and exclusion hide themselves under the guise of natural and objective forces (Latour 1999b). These theories are supported by a critical paradigm (see section 2.2.4).

Social shaping has been criticised for its narrow focus on political and social interests. As a result of its restricted scope focusing on social interests, it neglects the broader contextual issues that may be more unintended and often contradictory to particular interests. Social and technical relations often occur not as the direct outcome of the interests of individuals or groups, but as their unintended consequences. Moreover, the explanatory status of focusing on interests can be questioned since such interests are not autonomous forces that created themselves, but are often already an outcome of the exercise of power and other interests.

Socio-technical approaches

Taking a somewhat middle position between the theories of technological and social determinism are the theories that seek a different conception of the relationship between these two determinisms. The socio-technical perspective perceives the positive effects of technology as depending on both social factors and the technical qualities of the technology itself. Acknowledging the importance of variations in the organisational contexts of IT applications has led, for example, to the advocacy of user involvement in systems design.

Within IS research, a socio-technical approach is an attempt to understand the notion of 'information systems' not only as technology, but to include the idea of social practices as well. In the 1980's, a socio-technical approach was visible in the practice of systems development. It can be seen in the work of Markus and Robey (1988) who suggest an interactive approach when discussing the causal structure used in explaining IT-related change. Such an interactive approach posits that the way we use IT is a function of the interaction between both human choice and technological (and contextual) characteristics. Mumford and Hensall (1979) propose a participative approach in the design of information systems. Davis, Bagozzi *et al.* (1989) discuss a technology-acceptance model to predict how users will respond to computer systems. This model aims to help in altering the nature of the systems and the implementation processes to improve user acceptance. Agarwal and Prasad (1998) propose a socio-technical approach to systems design to make systems compatible with preferred workflows and behaviour patterns.

The socio-technical approaches share a common view of the social issues related to technology in that they hold on to a 'rational' technical perspective, which is limited in understanding the social. In such, these approaches have been called 'socially naive' (Avgerou 2002, p. 54). Though these approaches acknowledge both a social and technical side to information systems, they are treated independently and viewed from a similar (realist) paradigm.

Another limitation of the socio-technical approach is its lack of regard for organisational politics. It grants technologists the role of a 'neutral' change agent in organisational change and system development, thereby overlooking the fact that there may not be a neutral position in terms of desired goals or a shared notion on what constitutes a successful system. It favours a very rational view of technological and organisational change in that it neglects the various interpretations of what technology does and whether or not it is beneficial. Politics, unless they can be mobilised in favour of managerial goals, are considered disruptive.

More sophisticated forms of socio-technical approaches broaden their scope to include context and politics. However, they still demonstrate a limited (technology-

led) paradigm, compatible with a conventional one. Rather than a "matter of [...] 'needing to understand the organisational context, the stakeholders and the politics involved' (Meyers, Lee *et al.* 2000), which is ontologically realist, [socio-technical approaches should aim to] understand how a phenomenon is collectively constructed as real, which is ontologically constructivist" (Mitev forthcoming).

Social construction of technology

The approach of the social construction of technology challenges the boundary between the technical and the social. Denying all *a priori* distinction between what is social and what is technical, it argues that the world can be perceived to exist out of heterogeneous networks (Law 1992) made up of human and non-human actors. The social construction of technology denies giving a dominant role to either the technical (e.g. in technological determinism) or the social (e.g. in social shaping and determinism). Instead of understanding technology as black-box with innate qualities, social constructionists seek to understand why particular technologies emerge and how they are adapted (Bijker, Hughes *et al.* 1987). They argue that the success or failure of technological innovations is not just a matter of technological attributes but dependent on the interpretative action from people in their social context. Moreover, technologies continue to be (re)shaped during their use.

Critiquing social shaping and social determinism, Latour (1999b, p.198, original italics) argues: "*Society is constructed, but not socially constructed.* Humans, for million of years, have extended their social relations to other actants with which and with whom they have swapped many properties and formed collectives." He argues for more consideration of the influence of (technical) nonhumans in human action, since "humans are no longer by themselves" (ibid, p. 190). Technical artefacts, constructed in other times and other places, influence our current actions.

However, "in artefacts and technologies we do not find the efficiency and stubbornness of *matter*" (ibid, p.190, my italics), rather in the delegation to these nonhumans it is that "an action, long past, of an actor, long disappeared, is still active here, today" (ibid, p. 189). Of course matter has properties of its own (think of the inherent physical properties of concrete in speed bumps, as seen in the example below), but that does not "imprint chains of cause and effect onto malleable humans"

(ibid, p.190). Rather, "society and matter exchange properties" (ibid, p. 190), but not deterministically. Some of the characteristics of nonhumans become human, and some of the characteristics of humans become nonhuman. Resulting action is not a property of either the technical or the social, but rather of their association – a 'property' of the associated entities (in an actor network – which will be discussed further in section 4.3).

Latour gives the example of two conflicting expressions: "Guns kill people" versus "Guns do not kill people, but people kill people". He argues it is neither the sole properties of the gun, nor inherent bad qualities in the personalities of people that account for the action of killing; rather it is the association of the gun and the person which together (in a composite actor gun-person) are *equally* responsible for such action. Another example shows that social actions or intentions can be delegated to technical artefacts. Speed bumps slow down the speed of cars: concrete has been delegated a *program of action*, that of policemen[8]. The speed bump translates the driver's goal from 'slow down so as not to endanger pedestrians' to 'slow down and protect my car's suspension'. The action of slowing down the car no longer requires a policeman to be present. Similarly, such delegated actions (from long ago and disappeared actors) can be argued to be present in all non-humans around us. Latour states: "I live in the midst of technical delegates; I am folded into nonhumans" (ibid, p. 189).

Thus, the ontological belief is that reality is neither technologically determined nor socially constructed (i.e. a shared construction formed by social groups), but a *collective of humans and nonhumans*: a heterogeneous network of human and non-human actors.

2.2.6 Conclusion on paradigms and theoretical approaches

In our discussion, we have highlighted three paradigms influential in academic research, namely, the conventional, the constructivist and the critical paradigms. We acknowledge that such models have an impact on the way research is conducted and the results it finally yields. It is therefore important to be explicit about which models are central to this thesis.

In briefly discussing the different paradigms and theories about what is social and technical and by contrasting them and displaying them as extremes we have gained a means to position our research and its underlying assumptions. We assume that this provides sufficient information to aid in understanding the background of this research, given that we do not intend to apply mechanically one specific paradigm or ignore completely the notions of other paradigms.

Though we do not regard the conventional paradigm illegitimate for research, we do contend that it is not appropriate to our goal of developing an understanding of the (social) dynamics involved in the employment of evaluation methods. In this sense, we agree with Scherer (2003) that a researcher should not just follow one of the different modes of explanation (be it conventional, constructivist, or other) which might provide different but equally valuable insights, but rather should deliberately pick a paradigm that coincides with his or her research interest; one that is more appropriate to the research goals. For this reason, a constructivist interpretive approach that allows interpretation, analysis and understanding of the phenomenon of IT evaluation employment is adhered to in this research. The analysis part of our research does touch upon ideas related to the critical paradigm, specifically when we uncover taken-for-granted assumptions related to IT evaluation and its methods. However, it is not our aim to explore in-depth where these assumptions stem from or what interests they may serve, but merely to raise awareness that such commonsense assumptions do exist and may be critiqued. We do, however, adhere to notions of a pluralist view, acknowledging differences in the interests of social actors and possible conflicts.

With respect to the social versus the technical debate, we acknowledge that both are influential in the use and employment of IT evaluation methods. Adhering to neither one of the extremes of determinism, we adopt a more central position. As we shall see in Chapter 4, we employ the diffusion theory on the one hand, which can be regarded a *socio-technical approach*[9], and the actor-network theory on the other

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[8] In French, speed bumps are actually called 'sleeping policemen'.

[9] In its origin, the diffusion theory can be regarded as a theory applying a technologically deterministic stance, focusing primarily on the technical qualities of an innovation. In later versions, this theory encompasses more social aspects from an instrumental point of view.

hand, to which the *social construction of technology* is central. As will become clear in the subsequent chapters, our preference will go to the latter, which is more compatible to the constructivist paradigm that is central to this thesis.

This section has laid the foundations of our research and leads us to an approach that is considered appropriate for research: the interpretive research approach and the case study as a research method.

2.3 RESEARCH APPROACH, METHOD AND CASE SELECTION

2.3.1 Introduction

Building on the foundations of the previous section, this section describes what an interpretive research approach means to IS research. Furthermore, it elaborates on the case study research as the research method we choose to provide valid data for our analysis. Details are provided about which case is selected for study and how data are gathered and analysed.

2.3.2 Interpretive research in information systems

Recent IS research is inclined more and more towards interpretive research (Walsham 1993). It is based on the constructivist paradigm that social theory should not be based solely on empirical observations stemming from general laws, but to understand the social, one should understand the reasons for the action of an actor. Interpretive research is considered more holistic (as opposed to reductionistic) by acknowledging that there can be multiple interpretations of the same phenomenon. Interpretive studies reject the possibility of an 'objective' account of events, opting instead for a relativistic understanding of the phenomenon being studied (Orlikowski and Baroudi 1991). To understand and be able to theorise about a phenomenon, the interpretive research needs to get 'inside' the phenomenon; not observe it from a distance. Valid knowledge is gained through an understanding of the different interpretations and meanings people ascribe to their actions.

Though generalisation in a law-like cause-effect manner is not considered appropriate, interpretative research can be used to inform other situations or construct theories. Thus, Walsham argues that interpretive research can be

generalised in four ways: either by the development of concepts (which can become part of a theory), generation of theory, drawing specific implications in a particular domain of action or contributing to the richness of insight (Walsham 1995).

Within the IS discipline, a number of interpretive approaches have been employed in IS research such as phenomenology (Boland 1985), soft systems methodology (Checkland 1981) and ethnography (Orlikowski 1989; Prasad 1997).

Though the interpretive approach has been criticised for lacking rigour, precision and credibility, these criticisms have not taken into account that interpretive research is based on a constructivist paradigm and erroneously judge interpretive research on the criteria of conventional paradigm. Such criticisms include interpretive research as being unable statistically to generalise, to falsify hypotheses and to exclude biases from the researcher. From a constructivist paradigm these are not considered valid critiques. A response to them is given in the discussion of the case study approach in the next section.

Relevant critiques come from Orlikowski and Baroudi (1991, p.18), who show four strands of criticisms with regard to interpretive research. First of all, interpretive research does not examine the (often external) conditions that give rise to certain meanings and interpretations. Secondly, it fails to explain unintended consequences of action (Giddens 1979), since they cannot be understood by referring to the intentions of humans concerned. Thirdly, it does not address the structural conflicts within society. In other words, the interpretive perspective cannot account for situations where actors' accounts of action and intentions are inconsistent with their actual behaviour. Individuals are not always in a position to give a full account of their actions or intentions. More often, all they can offer are anecdotes of what they did and the reasons for their actions (Giddens 1984). And lastly, interpretive research does not explain how a particular social order historically came to be what it is and how it is likely to vary over time.

These criticisms are (partly) addressed by employing an interpretive approach that stems from the social construction of technology, namely the actor-network theory. This approach, and its own criticisms, is discussed in Chapter 4.

2.3.3 Case study strategy

A number of alternative approaches to IS research include laboratory experiments, field experiments, surveys, case studies, phenomenological studies, longitudinal studies and action research (Galliers 1985). According to Walsham (1993) case studies are perhaps the most appropriate strategy for conducting empirical research from an interpretive stance. It has been an accepted method for research in information systems for some time (Benbasat, Goldstein *et al.* 1987). Case studies are defined as an empirical enquiry that investigates a contemporary issue or event within its real-life context, especially where the boundary between such issues or events and its context is not clearly defined, and in which multiple sources of evidence are used (Yin 1989). The case study allows for 'thick description', which gives the researcher access to the subtleties of changing and multiple interpretations (Walsham 1995) which otherwise would have been lost. The aim of case-study research is not to say that the account given is what 'really happened', rather it is to make an informed interpretation and analysis of the events available (Geertz 1973).

Many of the criticisms raised against the case-study strategy relate to the fact that because it is specific to only a small number of cases, it is very hard to generalise (statistically) to a wider range of situations. However, as Yin (1989) argues, case studies are useful for analytical generalisations, where the researcher's aim is to generalise a particular set of results to some broader theoretical propositions. Walsham (1993) argues that from an interpretive stance, the validity of the results is derived from the plausibility and cogency of the logical reasoning in its analysis. From that perspective, validity does not come from a large number of cases, but the choice of a singular case study can as easily be justified (Lee 1989). In fact, given limited time and resources, the interpretive approach gives more weight to an in-depth case study with a thick description, rather than multiple case studies, which are less detailed. Moreover, to do multiple case studies they should be analytically justified (e.g. to show a remarkable resemblance or a distinction between the cases), rather than statistically (e.g. do multiple case studies to demonstrate that results can be generalised statistically). Our situation clearly calls for a singular case study.

In addition, the case-study strategy has been criticised for failing to meet the (conventional) criteria for rigorous and scientific adequacy, that being: *construct validity* (and *objectivity*), *internal validity, external validity* and *reliability* (Yin 1989, p. 41):

- construct validity: establishing correct operational measures for the concepts being studied, including an *objective* and neutral, free from bias, free from researcher prejudice;
- internal validity: establishing a causal relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships;
- external validity: establishing the domain to which a study's findings can be generalised;
- reliability: demonstrating that the operations of a study can be repeated with the same results.

These criteria are debated by Guba and Lincoln (1989) who claim that they may be perfectly reasonable and appropriate within the framework of logical positivism because they are grounded in the ontological and epistemological assumptions of the conventional (positivistic) paradigm. However, within a constructivist (interpretive) paradigm, these criteria are not meaningful and should be, according to Guba and Lincoln , replaced by *confirmability, credibility, transferability* and *dependability*. These can be described as follows:

- confirmability (instead of construct validity): establishing documentation in which the root of data can be tracked down to its sources and the logic used in the study is both explicit and implicit in the narrative of the case study;
- credibility (instead of internal validity): establishing a match between the constructed realities of respondents and those realities as represented by the researcher and attributed to the various respondents;
- transferability (instead of external validity): establishing the possibility (by thick description) of checking the degree of similarity between sending and receiving contexts;
- dependability (instead of reliability): establishing an audit, in which the research process is traceable and documented.

These criteria influence the selection of the case, the data gathering process and the analysis of the case, as discussed below.

2.3.4 Case selection

The research was conducted at one of the largest insurance companies in the Netherlands, which will be referred to by the anonym[10] 'International Insurance Company (IIC)'. It is part of a group of financial organisations consisting of a variety of banks and insurers, in this thesis referred to as the Financial Group United (FGU). IIC was selected because of its experiences and on-going efforts to employ an IT evaluation method. It has been involved in the employment process related to the IT evaluation method since 1996 and this continued during 2001, the period in which we conducted fieldwork. Actually being present while the dynamics still were going on proved to be beneficial, since the respondents could tell their stories vividly – their accounts had not yet been tarnished too much by the ravages of time. Moreover, documents and other sources of information (e.g. intranet sources) were ready-at-hand. On the downside, it is possible to argue that respondents were less detached from the phenomenon and (still) had personal agendas that could lead to tainted and partial views. However, this is considered endemic to interpretive research and thus does not pose any more problems than other interpretive researches face.

The case is particularly interesting due to the comprehensiveness of the IT evaluation method this organisation employed, which is not merely a financial accounting technique, but a methodology specifically constructed for the evaluation of IT investment proposals. Such cases are not widespread, as is discussed in section 1.1.4. Its uniqueness is strengthened when we consider the on-going effort: this was not a one-shot attempt, but a genuine effort to employ the evaluation method. The method, as we shall see in the case description in Chapter 5, has had a real impact on the

[10] An anonym is chosen to preserve the identity of the organisation itself. The primary reason for this was that the process, which was considered to be politically charged, was still very much on-going. Even more so, it was likely to continue for some time. Publications were regarded as potentially disrupting to this process. Moreover, past experiences with research having publicly spread confidential material has made the organisation reluctant to be fully cooperative in this. Since having an anonym was not considered to be a constraint for gaining the understanding this research envisioned, both at the start of the case study and in hindsight after the analysis of the research, this was considered to be acceptable.

organisation. The case therefore offers a source of insight into the dynamics, richness and complexity of the employment process to be studied.

Lastly, the insurance industry is considered information-rich and one of the most progressive sectors in their use of information technology. It is argued that much can be learned from organisations with relatively long experience with IT and IT investment decisions, making the research interesting for informing other cases of IT evaluation method employment.

2.3.5 Data gathering and analysis

Initial contact with IIC was made using the help of a consultancy company. Several other possible case studies had been discarded for lacking in detail and dynamics when compared to the one selected. To gain access to IIC several presentations and discussions about the researcher were given.

Empirical evidence was gathered using multiple methods of data collection. The main source of data was interviews that were carried out on site, typically lasting for about 2 hours. They were conducted between April and September 2001. Respondents were selected on the basis of their involvement in the design, implementation, use or evaluation of the evaluation method. All fifteen interviews were tape recorded, and extensive research notes were taken. The respondents were provided with an initial overview of questions, but interviews were not required to follow strict guidelines; they were more open and less structured. This flexibility gave the opportunity to zoom in and out when necessary. In addition, some informal (non-taped) discussions both with IIC as well as FGU employees took place during the fieldwork. A large number of other sources include public and confidential reports given to me by the respondents, the intranet of IIC and its Internet site. The reports included public reports, consultancy reports, press reports, technical documentation and annual reports. This allowed for triangulation (Jick 1979).

A heuristic approach was taken to determine the total number of interviews. Though it was easy to acquire more IIC respondents for the research, when no new insights were gained by interviewing and the gathered data was believed to be sufficient for a thorough analysis, we decided to stop adding respondents. The respondents were

chosen on the basis of involvement and use of the evaluation method and its employment process. Consequently, the respondents worked in functional areas such as finance, strategy, system development, program management and several managers of various business units were also included.

All formal interviews were transcribed and analysed qualitatively. Analysis centred on the events of construction of the evaluation method and the two applications of the evaluation method. Typical issues identified were: the reasons and prior conditions for the IT evaluation method to appear; the notion of rationality of the evaluation method; the processes of justification, scoring, prioritising and decision-making; the quality of evaluation results; politics in IT evaluation; the messiness of the prioritisation rounds and the appropriation and changing of the method. These and related issues were analysed by two strands of theories: the diffusion theory and the actor-network theory. They reappear in Chapter 5 and 6.

2.3.6 Conclusion

In conclusion, the research approach and method around which this thesis is built are the interpretive research and the case study. They match the constructivist paradigm and are considered to provide appropriate data in order to give a better understanding of the phenomenon of IT evaluation method employment. The case study provided a valuable source of data on the process of IT evaluation method employment.

2.4 BACKGROUND OF THE RESEARCHER

By employing a constructivist paradigm to this research, the background of the researcher is deemed relevant so that explicit and implicit ideas associated with the researcher may find their origins.

The researcher has an academic background in Applied Informatics from the University of Delft in the Netherlands, where a Master of Science title was attained in 1999. This technical university can be seen to promote a paradigm related to the socio-technical approach. The impact of that paradigm is clearly visible in the Master's thesis, which was on the topic of the life cycle IT evaluation at financial

institutions, and in different publications by the researcher (e.g. Nijland 2000; Berghout and Nijland 2002).

The researcher was employed as a management consultant during the duration of his PhD research. As a consultant, the researcher was not only involved in numerous projects related to the costs and benefits of IT in organisations, but also in projects relating to the insurance sector. During these projects, in-depth knowledge was acquired about practical problems in IT evaluation and its employment process, common business processes in insurance organisations and IT developments relevant to the insurance industry. Familiarity with both the topic of IT evaluation as well as the insurance sector proved to be helpful during data gathering. Moreover, the researcher's background as a consultant helped to relate to respondent's issues, which supported the interviews in data gathering.

The academic environment of the London School of Economics has also been influential. As Orlikowski and Baroudi (1991) argue, "research methods and assumptions are not learned and appropriated in a vacuum. They are heavily influenced by the doctoral program attended, the agendas of powerful and respected mentors, the hiring, promotion, and tenure criteria of employing institutions, the funding policies of agencies, the rules of access negotiated with research sites, and the publishing guidelines of academic journals" (ibid, p. 24). Obviously, studying Information Systems at the London School of Economics (LSE) and Political Science, which promotes interpretive research, has influenced the choice of research methods and assumptions – much like social developments effect acceptable approaches to information systems research in general (Klein and Hirschheim 1987). Research at the LSE involved the shift in paradigm from the researcher's technical background to an interpretive perspective, something which can be regarded as quite radical. The change in research assumptions by the reseacher, influenced by the doctoral program, is not considered a constraint. On the contrary, in hindsight this can be seen to have opened up completely new perspectives and provided the researcher with new insights. This applies not only to the research at hand, but also to how organisations, society and academic research are perceived and to the problem of understanding what constitutes reality. And that, apart from the research ambition

to contribute to the field of IT evaluation research, has been one of the most important reasons for undertaking this research.

2.5 CONCLUSION

In sum, this research can be seen to be located at the constructivist end of the paradigm spectrum. Both social and technical issues are considered to influence the phenomenon under study. The interpretive approach to conduct research is regarded as appropriate and the case-study strategy has been chosen since it fits the philosophical assumptions underlying this research. These choices are compatible with the goals laid down in this research. A single case study has been selected because it offers a unique opportunity to study the complexities of the employment of an IT evaluation method in detail.

In the next chapter we continue our theoretical exploration by discussing the literature on the topics considered relevant to our research. Both this chapter and the next demonstrate with which background knowledge and beliefs we enter our research.

Chapter 3: Literature Review

3.1 INTRODUCTION

In this chapter, we review the relevant literature to establish a theoretical background to understand the employment of IT evaluation concepts in organisations. We thereby heed the warning of Weick (1984) that everybody has theories, but often they are specific and implicit. They impede understanding and act as blind spots since "believing is often seeing" (ibid, p.113). People see what they expect to see and do not learn to see what they have overlooked. We will discuss the literature relevant to our research and hope to make the current theories and their assumptions more explicit and broader in order to widen our perspective in understanding and "enlarge the set of events to look for" (ibid, p. 129) in our research. Whereas Chapter 2 focuses on the underlying beliefs, this chapter focuses directly on the topics relevant to our research.

The research purpose is concerned with "understanding the *employment* of *evaluation methods* in *organisations*" (see section 1.2.2). This phrasing shows three relevant parts: evaluation methods, their employment and organisations. Each part will be examined in more detail in the following sections. We will start by examining evaluation and its methods. We will review the literature on evaluation in general and IT evaluation in particular. We will continue with a discussion about the literature on the employment of evaluation processes, evaluation results and evaluation methods and will end by discussing a selection of organisational literature. From the literature on organisations, it will become apparent that a particular view on organisations can shape the understanding of how they behave with respect to the use and employment of evaluation concepts.

3.2 EVALUATION METHODS

3.2.1 Introduction

In this section we discuss the meaning of evaluation. What do we mean by evaluation? In particular the evaluation of IT is addressed and why it seems especially difficult. In addition, we discuss IT evaluation methods. Finally, two

recent shifts in underlying perspectives (related to issues discussed in Chapter 2) on IT evaluation are presented: the interpretive and critical perspective.

3.2.2 Understanding evaluation

To understand IT evaluation, it seems reasonable to first try to understand exactly what evaluation means. However, constructing a definition of evaluation is difficult. A first observation of the word evaluation shows that it can denote both a *process* (e.g. the activity of evaluating) and a *result* (e.g. the findings or result of an evaluation). This distinction is important since evaluation processes can have a significant impact quite separate from the actual findings of an evaluation (Willcocks 1996b). For example, evaluation processes can be useful in helping people clarify what they are doing, in establishing priorities, focusing resources and activities on specific outcomes and identifying areas of weakness even before data are collected (Patton 1987).

A common aspect in many understandings and definitions of evaluation is the assessment of value or worth (Legge 1984; Willcocks 1996a). Legge argues: "We all evaluate, that is assess, against implicit or explicit criteria, the value or worth of individuals, objects, situations and outcomes, informally and often unconsciously every day of our lives. The reasons we do this are a source of considerable controversy, but it appears that we require a rationale for the choices that are supposed to shape our actions" (Legge 1984, p. 3). As such, evaluation might even be claimed to be a 'natural human desire' (Hirschheim and Smithson 1988). Beside this informal evaluation, formal evaluation seeks to contribute by providing decision-makers, directly or indirectly, with an objective and reliable information base to facilitate decision-making (Legge 1984, p. 5).

In *ex ante* situations, evaluation often is related to the assumption of scarce organisational resources (e.g. financial budget or IT personnel), which demands that proposed investments be evaluated and resources allocated in the direction believed to be most fruitful (Legge 1984; Parker, Benson *et al.* 1988; Berghout 1997). In these situations, many researchers therefore link evaluation to organisational processes such as organisational decision-making or policy making (Palumbo 1987). By contrast, in *ex post* situations, evaluations are related to measuring how well

something meets a particular expectation, objective or need (Hirschheim and Smithson 1988). In general, researchers agree that an important function of evaluation is to provide information for decision-making (Weiss 1972). The assumption is that evaluation provides feedback about the products and processes of a change (i.e. a project or investment proposal), which reduces uncertainty for the decision-maker, and enables him or her to adopt a more controlling, proactive and less *ad hoc* reactive position (Legge 1984).

Another complexity in understanding evaluation is its development through time. Guba and Lincoln (1989) discuss three changed meanings that have been assigned to evaluation in the area of education policy and practice in the United States for the past hundred years. These three generations of evaluation are a generation of *measurement*, where different variables were *measured* using developed measurement instruments for students; a generation of *description*, where variations from a stated objective (such as programs and strategies) were *described*; a generation of judgment, where evaluators as objective outsiders were to *judge* their findings against certain defined standards and intrinsic or contextual values. Each subsequent generation represented a step forward, both in the range of substance as well as in its level of sophistication. Guba and Lincoln themselves propose another fourth generation of evaluation meaning in which the *negotiation* of different claims, concerns and issues from various stakeholders is central.

Understanding evaluation related to its functions and purposes is intricate as well. The IT evaluation literature shows that evaluation can serve many various objectives (e.g. Kumar 1990; Farbey, Land *et al.* 1993; Ballantine and Stray 1998; Powell 1999):

1. To justify investments;
2. To enable organisations to decide between competing projects (which claim the same resources);
3. To enable decisions concerning expansion, improvement or the postponement of projects;
4. To gain information for project planning;
5. To act as a control mechanism over expenditure, benefits and the development and implementation of projects;

6. To act as a learning device enabling improved appraisal and systems development to take place in the future;
7. To evaluate and train personnel responsible for systems development and implementation;
8. To ensure that systems continue to perform well;
9. To enable decisions concerning the adaptation, modification or dismissal of information systems;
10. To allocate (and distribute) costs and benefits to appropriate organisational departments or business units.

In these different objectives, a certain life cycle concerning IT investments and projects is discernable. A life cycle approach has been promoted by researchers, stressing the importance of evaluation and actively managing the realisation of IT benefits throughout the life cycle (e.g. 'benefits management' from Ward, Taylor *et al.* 1996). In IS development and implementation there are various stages of the system's development in its life cycle where evaluation practices may take place (Willcocks 1996a; Swinkels 1997): the proposal / feasibility stage, the development stage, the post-implementation stage and the stage of routine operation. It is argued that evaluation practices take place during the whole life cycle, though they might vary in formality (Hirschheim and Smithson 1999) and extent to which they are implemented.

During the *proposal/feasibility stage, ex ante* evaluations are performed to assess a project proposal for its financial and non-financial acceptability. The term 'appraisal' may be used for this kind of evaluation (Ballantine and Stray 1998).

During *development,* IT projects are constantly being monitored and financially controlled. Specific cost-estimation models, such as COCOMO, function-point analysis and Putnam's SLIM (see Tate and Verner 1991 for an overview) have been developed to refine development cost estimates.

At *implementation*, assessments take place to see if the project is delivered according to the agreements made before development (e.g. on time, with the agreed quality

and functionality, within budget, etc.). Project management approaches (e.g. PRINCE2) have been developed to assist in this.

Post-implementation evaluation concerns *ex post* evaluations of the completion of the project and comparing the realised outcomes to the expected outcomes (e.g. examining overspends, expected benefits, etc.). Or, in the case of radical changes in the environment (Farbey, Land *et al.* 1999b), compare outcomes to the best achievements possible in the new circumstances (e.g. unanticipated benefits and adjusted costs and benefit expectations). One of the better known models to assess the success of an information system is that of DeLone and McLean which considers system quality, information quality, the user, user satisfaction, individual impact and organisational impact as attributes of the success of a system (DeLone and McLean 1992). Different variations on this model have been proposed (e.g. Garrity and Sanders 1998; Ballantine, Bonner *et al.* 1998).

Finally, during *routine operation*, the everyday evaluation of operational information systems is concerned with the 'smooth' running of the systems (e.g. performance measures, operational time, conformity with service level agreements, etc.).

Most of the specific IT evaluation literature focuses on either or both *ex ante* and *ex post* evaluation, covering only the proposal/feasibility and post-implementation stage. The literature on evaluation during development and routine operation is mainly located within the area of IT project management and quality management. A notable exception is the work of Klompé (2003) who specifically addresses the management and evaluation of benefits and burdens of operational IT.

Another view on evaluation is its classification as being either *summative* or *formative*. Summative evaluation emphasises the performance and attainment of objectives, judging if (closed) projects achieved their objectives – mostly for purposes of accounting and control (Legge 1984). Formative evaluation is designed for illumination and learning (Farbey, Land *et al.* 1999a) in order to improve on-going efforts. The majority of the ten evaluation objectives mentioned above can be said to be formative, whereas calculations like return on investment (ROI) and net present value (NPV) can generally be viewed as summative.

The list of objectives presented above suggests that evaluation in itself never is an isolated goal, but that the results of an evaluation always serve some other goal related to managing and controlling the impact of IT on organisational costs and benefits. Besides these 'overt' goals, evaluation can serve '*covert*' ones as well. Covert goals are goals which one or more stakeholders in the evaluation consider inappropriate to admit to publicly, mainly because they serve their own interests above those of others (Legge 1984). These include rallying support/opposition for a proposal, postponing a decision or evading responsibility. Moreover, evaluation can serve various *ritual* goals which may include a symbolic expression of an image of rational and accountable management (Symons and Walsham 1991; Carruthers 1995), or the fulfilment of an evaluation only as a requirement for financial funding (Legge 1984), a procedural obligation to evaluate (Irani and Fitzgerald 2002) or a disengagement device to denote the end of a project (Kumar 1990). Though evaluations might serve symbolic or ritual goals, some researchers argue that they are not to be abandoned blindly (Symons and Walsham 1991). Walsham (1999) states: "Symbolism and ritual in human affairs are very important, not least in business organisations, and ritualistic evaluation exercises should not therefore be condemned out of hand" (ibid, p. 368). Through this symbolism and ritual, a sense of security and reassurance is gained (Knights and Morgan 1991). However, due to the use of methods in a covert or ritualistic manner, an important assumption held by many researchers arguing for the use of evaluation methods proves to be false. Namely, the assumption that performing an evaluation automatically translates into improved management of IT costs and benefits (as would the list of 'overt' goals suggest).

Acknowledging the existence of a multitude of different goals, including covert and ritual goals, we see that evaluation may serve multiple purposes simultaneously. These purposes may be very dependent on the perspective of the stakeholder. For example, those responsible for carrying out the evaluation may have very different purposes than those utilising the results of the evaluation in decision-making or those affected by the results of the evaluation. In the processes of evaluating, people may wish to 'play it safe'. They may also be inclined to provide partial information, thereby conceivably preventing a project from living up to its full potential or leading to the rejection of the evaluator findings (Legge 1984). This can be related to the

different organisational roles responsible for IT. Griffiths (1994) argues that being unclear or implicit about the separate responsibilities on decision-making in IT, providing IT, using IT and the evaluation of IT may cause unwelcome effects in managing IT, possibly leading to a too dominant role for either IT management or business management.

In conclusion, evaluation is a complex phenomenon with its multiple meanings and functions. Evaluation can be a process and a result; formal and informal; *ex ante* and *ex post*; summative and formative. Moreover, it can serve a variety of functions, including overt, covert and ritual functions. The notion of value-pluralism and differing purposes by different stakeholders make evaluation an inherently social and political phenomenon. To understand evaluation means finding a way to cope with all these different elements. Matters become even more complex when we consider the topic of evaluation, in our case information technology and systems.

3.2.3 Evolution of evaluation practices

By focusing on evaluation in IT and IS, we can trace an evolution of evaluation through time. This evolution is linked to the changing role of IT in organisations which in turn is linked to the value attributed to IT. The evolution can be depicted in a 'stages of growth' model (Nolan 1979) which assumes a process-based approach to gaining understanding about how an organisation evolves with information technology (Galliers and Sutherland 1991) and its evaluation (Reeken 1997 - see Table 3.1; Farbey, Land *et al.* 1995).

The first applications of computers were in *automation*. The primary goal of these investments was to attain *efficiency* benefits by substituting manual labour by computer processors. These applications were followed by an informatisation type of investments in the form of management and transaction information systems which made new activities possible. No longer did mere substitution of existing work take place, but new objectives could be attained more effectively. Related benefits were in terms of attaining better, faster or more results.

Informatisation was followed by alignment in which systems were developed to support the whole business rather than partial functions or individual departments. These types of IT investment allowed for improved business competition. More advanced IT investments were geared towards transformation. To benefit more from IT, organisations' strategies were tuned to make better use of IT applications. Organisations were transformed and organisational work processes redesigned with the aim to provide customers with better quality and services. IT can thus be said to provide new ways of thinking, working, organising and managing.

Whereas automation, informatisation, alignment and transformation were focused on improving business processes by using IT, the anticipation type of IT investment is aimed at providing the organisation with flexibility. By discarding rigid IT components and infrastructures, these investments in flexibility were aimed at benefiting the swiftness by which an organisation could cope with market changes. Finally, the venturing IT investments allowed organisations to develop new products and enter new markets, thus creating new business opportunities.

Types of IT investment	Automation	Informatisation	Alignment	Transformation	Anticipation	Venturing
Result Characteristics	Automatic data processing	New activities: transaction & management information systems	Strategic information systems	Redesign of business processes and networks	Pro-active infrastructure	New product/market combinations (PMC)
Intention	Substitution	Improvement	Strategic fit	Restructuring	Flexibility	Marketing
Benefits	Efficiency (cheaper)	Effectiveness (faster, better, more)	Competitive response Competitive advantage	Customer satisfaction (Quality)	Reaction capacity	PMC profitability
Uncertainties	Technical uncertainty	Specification uncertainty	Organisational uncertainty	Organisational uncertainty Strategic IS architectural uncertainty	Strategic IS architectural uncertainty IS infrastructural uncertainty	Business uncertainty

Table 3.1 Typology of IT investments and their characteristics (Reeken 1997)

Through time, the use of IT has evolved dramatically and with it the nature of its investments. Through the years, IT has offered an increase in potential benefits, but also an increase in uncertainty and risks pertaining to outcomes as well as an increase in the difficulty of communicating and demonstrating relevant benefits (Farbey, Land *et al.* 1995). Though the framework is not intended to limit individual IT investments

or impose a strict timeline, it does sensitise us to the fact that IT evaluations have constantly experienced changes in the object under evaluation. Today, all of these types of IT investments, including combinations of them, are the concern of IT evaluation. IT evaluation methods should take into account all their various characteristics; or as some propose, depending on the application of IT, appropriate evaluation techniques should be chosen (Farbey, Land *et al.* 1992).

3.2.4 The uniqueness of IT evaluation

Why is the topic of *information technology* evaluation relevant separate from other (organisational) evaluations? Is the evaluation of IT investments dissimilar to the assessment of other investments that an organisation may wish to undertake? Why should IT be approached with its own set of evaluation methods?

One could argue that IT investments are different because IT is different (Powell 1999). This perspective might be attributed historically to early researchers that have technical rather than economic or managerial backgrounds. When later business-related researchers entered the field of research, the myth that IT was actually different had already been established. Some however argue that IT investments are genuinely different, in that their costs and benefits are hard to quantify. Arguments that favour this position stress the large portion of intangible elements, the uncertainty and risks of IS projects, the greater impact on a larger number of elements of the business, the immaturity of the IT industry, the unproven technology of IT applications and the shorter life cycle than non-IT investments (Ballantine, Galliers *et al.* 1995).

Serafeimidis and Smithson (1995a) argue from their case study that "while IT resources ought to be treated no differently from other capital resources, all too often in practice they were different. Much depended on what kind of IT was being considered, what kind of benefits were expected and, no less significantly, what kind of IT is even available." (ibid, p. 225).

However, evaluation of education, hospitals, healthcare, research & development and governmental programmes might be considered even more complex than IT

evaluation (Guba and Lincoln 1989; Powell 1999; Nowak 1991; Mayne, Bemelmans-Videc *et al.* 1992). The field of engineering can be seen to be confronted with similar intangibles, high costs and a high degree of innovativeness (e.g. in the construction of new factories) as in the field of IT, but despite those complexities, engineering uses evaluation methods (Powell 1999)[11]. Moreover, problems inherent in many types of investment consideration are often similar; all capital investments can be seen to have the following facets (Ballantine, Galliers *et al.* 1995): a project type (i.e. related to a particular area of the business); size of investment (i.e. generally measured in terms of the amount of resources allocated to it); a level of return and distribution over time; a source of funding (internal or external); a relationship to a particular organisational function or sub-budget; a risk level; an impact (e.g. strategic, operational); a method of appraisal and subsequent evaluation; alternatives which compete for funding; timing in terms of estimated project life; and a proposer (largely related to functional areas). So, what is so special about IT that it requires specific evaluation methods?

One possible answer to this question maybe found in the innovative and new applications of IT. Powell contends that in the contemporary network-based area for IT evaluation practices it may not be "business as usual" (Powell 1999). Discussing three cases, he demonstrates that investments related to network-based systems, Internet and new types of (virtual) businesses require an IT-specific understanding of risks, cost structures, benefits and timescales. Still, did the IT investments in previous decades then not require such an evaluation? Maybe a more satisfying answer lays in the oddity of the object under evaluation, in this case *information.*

IT evaluation is all about assessing, or (e)*valuating*, the value of information technology. Some of the problems with evaluating IT are thus said to arise due to the differences between information and physical goods. It is commonly asserted that information has certain general characteristics which make it very difficult to assess its value (e.g. Van Alstyne 1999; Berghout 1993). Information from this perspective is a non-physical thing which is easy to duplicate, transport and manipulate at low costs. It can also be said to have an abstract nature in the way information can

[11] The only difference Powell asserts with IT is that engineering through the years has acquired a large databank of historical information on relevant costs and benefits.

represent collection of ideas. In other words, the same information can be represented at different levels of abstraction (e.g. condensed by a formula). Furthermore, when information is sold or given away (through duplication), the seller retains the same information. It can be sold again. Moreover, the value of information drops quickly after the information has been made public. This attribute of information is also accountable for the buyer's inspection paradox: potential buyers of information cannot assess the information without acquiring it during the assessment process of assessment. In addition, the value of information is not additive: additional copies of the same information are not necessarily worth more to the possessor than the first copy. Finally, the value of information is dependent on its use. It has no intrinsic value, but depends on its context to generate its value. Thus, its value can only be measured in its use.

Though such a view on information seems appealing, a different perspective is offered by Boland (1987; 1991). He argues that information is not some (non-physical) thing, object, or structured data that can be transported free of interpretation. Instead, he argues that the essence of information is '*in-formation*': the inward forming of a person due to an encounter with data. It involves a change in the knowledge, beliefs, values or behaviour of that person. Therefore, information only exists embodied in human beings and is found in the lived experience of human condition. Through situated hermeneutic interpretation, information becomes meaningful. "Information is not a resource to be stockpiled as one more factor of production. It is meaning can only be achieved through dialogue in the human community. Information is not a commodity but a skilled human accomplishment" (Boland 1987, p. 377). From this perspective, information is far from easily duplicated, transported or manipulated. This not only goes beyond the notion that the value of information depends upon how it is used by its user, as argued above; it also challenges the view that the value of information can be measured objectively. The value of information can only be discussed meaningfully *in casu* and can only be interpreted (socially), not measured. This relates to the notion of value described by Legge (1984) who states the following propositions about value (ibid, p. 149):

1. Values derive from and are embedded in communities of people who share experience and attributed meanings;

2. Values are ideas about what 'should be' to produce the kinds of consequences an individual or group desires;
3. An entity, such as a change programme or IT investment, has value if those attributing value to it believe it has produced desirable consequences.

Thus, the argument is that due to the value of information being a *social construction*, the evaluation of IT investments is a complex phenomenon. Though other (non-IT) investments may be equally (or even more) complex, specific attention to the valuing and evaluating of IT is (also) justified.

3.2.5 IT evaluation methods

The development sketched in the preceding section is reflected in the methods and tools that have been developed through time to support the evaluation of IT expenditures and investments. Rather than merely performing a cost analysis, managers nowadays are required to make an investment appraisal. This means a shift from cost management to return or benefits management. Cost management tools have been exchanged for methods from accounting, such as net present value (NPV), return on investment (ROI), internal rate of return (IRR) and payback period (Earl 1989). Whereas cost management tools only focus on controlling costs, these methods encapsulate typical investment characteristics, taking into account both financial costs and benefits, acknowledging the future impact of the investment and considering the influence of time on financial value (discounted cash flow) as well as the possibility of comparing different investments quantitatively. With this shift, IT investments were acknowledged as strategic investments.

However, these accounting or discounted cash flow (DCF) methods have been widely criticised on a number of points (e.g. Earl 1989; Willcocks 1994; Farbey, Land *et al.* 1999a). One major point of critique is their disregard for non-financial and intangible costs and benefits (Parker, Benson *et al.* 1988). In assessing financial figures only, they disregard benefits common to certain IT investments, such as quality improvement of products, better customer support and improved decision-making. Also, indirect and hidden costs are overlooked (Keen 1991; Irani and Fitzgerald 2002). Further criticisms include their disregard for project risks.

Typically, an investment is concerned with future expectations and uncertainties. Neglecting these uncertainties poses a risk to the investor. In addition, the methods do not inherently show the risks of *not* performing an investment - i.e. the risks associated with doing nothing (Powell 1999). Many IT investments are justified not because they have financial benefits, but because, quite simply, it is necessary to comply with them. Good examples are governmental regulations, or the need to cope with external developments (e.g. the millennium bug at the end of the '90s or the investments required to comply with the introduction of the euro currency in 2000). Moreover, the methods favour cost reduction and short-term returns and disfavour innovative organisational changes and strategic opportunities (Walsham 1999). Discounted cash flow techniques used in the calculations of accounting figures value short-term benefits higher than benefits that are long-term. The methods have also been blamed for turning decision-making into a "numbers game" (Bacon 1992), rather than help support decision-making based on a real understanding of a project. Moreover, it is argued that their reduction to economic terms is too one-dimensional for complex IT investments since they disregard human and social consequences (Land 2000; Hirschheim and Smithson 1988). Their focus of evaluation is narrow, concentrating on the technical system in itself, rather than the intervention as a whole, of which the (new) system is just a part (Walsham 1999). Finally, these traditional methods are aimed at project level while other levels, for example the IT portfolio (considering the relationship to other projects), are neglected. The links between this investment and other investments or developments are not an inherent part of these methods (Farbey, Land *et al.* 1999a).

Focusing on the deficiencies in traditional approaches to the value of IT, Parker, Benson et al. (1988) in their influential book titled "Information Economics" critique the traditional tools in cost-benefit analysis since they cannot easily be applied to their six identified classes of *value* specific to IT investments: (1) *return on investment* defines the financial effects from IT; (2) *strategic match* is the value derived from supporting an existing business unit strategy; (3) *competitive advantage* is the value derived from creating a new business strategy, new product or new approach to overcoming a competitive force or hurdle; (4) *management information* is the value derived from information support on organisational processes critical to the success of the organisation; (5) *competitive response* reflects the value derived

from IT projects intended to catch up with the competition; (6) *strategic IS architecture* is the value derived from investments in IT that enabled other projects to occur. Thus, Parker, Benson et al. redefine value of information to incorporate these six elements.

Parker, Benson *et al.* do not discard the traditional financial techniques, but propose additional techniques to account for both the values mentioned above and project risks that might influence costs and benefits. To assess both the financial and non-financial (intangible) impact of projects, they propose a multi-criteria approach. This approach is one of many *multi-criteria methods* that have been developed through the years to cope with the deficiencies of the traditional financial methods (Renkema and Berghout 1997b). The multi-criteria methods share a common usage: they (1) establish a set of criteria; (2) appoint relative weights to the different criteria; (3) score all investment proposals on the criteria; and (4) calculate final scores for each proposal by multiplying all given scores by the relative weights and adding them together. According to these methods, the proposals that end up with the highest score are the ones with the highest value.

Which *criteria* are used in IT methods to decide IT investments are significant for a number of reasons (Bacon 1992). First of all, they significantly impact the effectiveness with which IT investments are made. The criteria specify which projects are the 'right' projects to be selected, and which projects will not be carried out. From this viewpoint, if a 'wrong' set of criteria is selected, a wrong (less effective) set of projects will be the outcome of evaluation. Secondly, they contribute to the finance and management accounting function of the organisation by optimising the return on investment through involvement in the cost / benefits analysis that may precede an IT capital investment decision. Thirdly, they are responsible for presenting the right 'balance' between quantitative and qualitative effects. Quantitative measures are usually necessary to understand the financial details involved in the investment and provide the possibility to track, evaluate and screen the investment once it is being carried out. Qualitative measures generally demonstrate the effects of the intangible costs and benefits. Critiquing the objectivity of criteria, Legge (1984) argues that the selection of criteria will depend on the desirable consequences the investments should have. What count as 'desirable' and

which projects are 'right' will depend on the developers of the evaluation criteria (or their sponsors); their overt and covert functions of the evaluation will undoubtedly shape the method, possibly to the detriment of other functions and consequences desired by others. Such a critical view on evaluation is further elaborated on below in section 3.2.7. Despite the supposed significance of these criteria, Huerta and Sanchez (1999) show that often such criteria are a mismatch to the actual goals of IT projects. Many times only financial criteria are evaluated, whereas organisational IT strategy is not focused on (merely) obtaining financial goals. In addition, they note that this does not always lead to results that the related organisations find unsatisfactory. It can thus be concluded that the influence of evaluation criteria on the outcomes of IT investments is not always significant to success, but may be dependent on how strict they guide the decision-making process and the implementation of the resulting IT investments.

Elements typically assessed by IT evaluation methods are (e.g. Berghout 1997) benefits such as developing new products, entering into new markets and improving the relation with existing customers. In addition, benefits are seen in a more flexible production, improved functionality of the information function regarding the provision of internal information, improved external information provision, improved quality of the information function and further extension of knowledge of the information function. We also see savings in labour costs, assets, capital and in improved working conditions. On the cost side, the negative effects of these elements are considered. In addition, some methods take risks into account by using scenario techniques (e.g. best and worst case), ranged estimates (e.g. minimal and maximum value) or probability calculations (e.g. option theory), just to name a few. Other elements typically assessed are based on an evaluation approach, called the Balanced Scorecard (Kaplan and Norton 1992). It stresses a balanced approach, not focussing solemnly on financial aspects, but also on internal business aspects ("*What must we excel at?*"), innovation and learning ("*Can we continue to improve and create value?*") and the customer ("*How do customers see us?*"). This approach can also be seen influential in the case study (see section 5.4).

A great number of IT evaluation methods have been designed over the last few decades (see Renkema and Berghout 1997b and Wolfsen and Lobry 1998 for an

overview), created both by academics as well as practitioners. These include more advanced financial methods (e.g. methods based on option theory), multi-criteria methods, ratio methods (e.g. return on management - Strassmann 1985) and portfolio methods (e.g. the IT portfolio method by Renkema and Berghout 1997a). The list of evaluation methods designed is continually growing. Recent additions to the list include methods for IT evaluations in general (e.g. Hogbin and Thomas 1987; Berghout 1997; Gunasekaran, Love *et al.* 2001; Irani and Love 2002) or specifically tailored for certain industries or IT applications (e.g. Hoogeweegen, Streng *et al.* 1998; Shang and Seddon 2002; Murhpy and Simon 2002).

Although addressing some of the limitations associated with the discount cash flow methods, a few additional critiques have recently been added to many of these newly developed methods. One criticism is that in general, multi-criteria approaches are intended for *ex ante* investment evaluation only. They are used to appraise investment proposals. However, evaluation should also be performed *ex post*. The reasons for this are to ensure that planned benefits are in fact being delivered, to identify unforeseen or unexpected benefits or costs and to acquire experience for future proposals and projects (Farbey, Land *et al.* 1993). To include *ex post* evaluation and other evaluation phases (see section 3.2.1), several researchers have extended the scope to the life cycle of the investment (Farbey, Land *et al.* 1993; Willcocks 1996b; Swinkels 1997; Ward and Griffiths 1996) and propose a broader life cycle approach to IT investments.

A more fundamental critique stems from the fact that most of these methods could be classified as being derived from a conventional paradigm. When it comes to evaluation, they display a tendency toward a measurement of reality. Though reality may be perceived differently by different people, in the end their assumption is that reality is singular and independent. Problems in perceptions of 'true' reality are related to difficulties in assessing *all* consequences of a proposal (e.g. too costly, too time consuming or too hard to obtain). A lack of quality of information (e.g. its unavailability, unreliability and imprecision) and various cognitive 'limitations' (e.g. bounded rationality, information overload, cognitive dissonance, group think, risk aversive behaviour, preferences for simple and easy collectable data, an inclination to favour first impressions and other psychological constraints – De Vries 1993; Mares

1991; see also section 3.4.5) are elements that also influence an individual's perception of reality. Considering a multi-criteria IT evaluation method Berghout (1997) talks about an 'increase in subjectivity' when subsequently assessed consequences of an investment are connected to corresponding evaluation aspects, and when these consequences are scored and finally an overall score is given by multiplying the weights of aspects to the scores of consequences. The final score seems to be highly subjective and far from the 'real' consequences. Another illustration is the methodology of Applied Information Economics promoted by Hubbard Ross Associates – Ross 1999). It states that every real phenomenon can be measured; if it cannot be measured it is not real. Precisely this argumentation has been critiqued by Weick (1984, p. 129), calling it *illogic.* He argues that omitting attributes in a forecast or estimate that are obviously relevant to the result, since they could not be objectively measured, is to value them zero. Though one might respond that *all* attributes (including intangibles) may be measured, this goes beyond the acknowledgement that inherently different people will hold different interpretations of the same attributes; in fact they will have different social constructions of the same phenomena. Therefore, such a response can be seen to be too connected to a unitary rather than a pluralist view (see section 2.2.4).

In sum, conventional ontological standpoints are lodged in discount cash flow methods, but in the newer sophisticated methods as well, specifically multi-criteria methods. For this reason, these methods have been criticised for their limited consideration of human, social and political aspects (Hirschheim and Smithson 1988; Walsham 1999; Farbey, Land *et al.* 1999a) and their lack of consideration of the organisational context (Serafeimidis 1997). Moreover, they are criticised for their limited perspective on the evaluation process that underemphasises the involvement and commitment of stakeholders (Symons and Walsham 1991). These criticisms lead researchers to propose *an interpretive evaluation of IT* as a way of gaining a deeper understanding of the different interpretations of various stakeholder groups in an organisation in an evaluation exercise. Thus, the purpose for an interpretive evaluation is to deepen understanding and to generate motivation and commitment (Walsham 1999).

3.2.6 Interpretive view on IT evaluation

In taking an *interpretive* stance, which recognises information systems to be more social systems than technical systems (see section 2.2.5), it can be concluded that most IT evaluations concentrate on the technical rather than on the human and social aspects of the systems (Hirschheim and Smithson 1988). By contrast, interpretive researchers claim organisations are complex social and political entities that defy a purely objective technical analysis. Because information systems are part of organisations, they cannot be viewed in isolation, but should also be considered as social systems. Interpretive researchers deny the ontological belief that information systems are fundamentally technical systems. Many examples in the literature show the success or failure of an information system to be determined by 'people problems' and not by technical aspects (Lyytinen 1987; Symons and Walsham 1991). The socio-organisational impacts are frequently the most wide-ranging. Thus, these researchers argue a comprehensive information system's evaluation must be significantly broader in scope than methodologies such as cost / benefit analysis, value analysis and decision analysis. IT evaluation should take into account both the technical and social aspects of a system. In order to incorporate these more problematic social aspects into the evaluation, a deeper understanding of the nature and the process of evaluation is required. Hirschheim and Smithson (1988) therefore propose an interpretive IS perspective to understand IT evaluation. They criticise the most current evaluation methods as treating individuals as though they are deterministic to the extent that they respond to events in predictable and determinate ways. And although this approach may be appropriate for studying a subject that does not possess a free will, interpretivists argue that information systems are fundamentally human and social entities and therefore require a different approach.

In sum, information systems are perceived to be social systems and an analysis which treats them as distinct from their infrastructure and context will lose correspondingly in richness of understanding. Historical, social and political issues may be of equal or greater importance than the technical and economic dimensions – for example, visible in the covert functions of evaluation (see section 3.2.1).

Discussing the three historical generations of evaluation (discussed in section 3.2.1), Guba and Lincoln (1989) operating from an interpretive stance have noticed three

major flaws in each of the generations. These are the tendency of the evaluation to favour the manager who commissioned the evaluation, a failure to accommodate the multiple values in evaluation and an over adherence to the scientific paradigm of inquiry based on the conventional philosophical assumptions. To tackle these deficiencies, Guba and Lincoln propose a fourth generation in which the different claims, concerns and issues from various stakeholders about the subject under evaluation are central. This fourth generation is linked to a constructivist perspective which also can be termed as an interpretive approach (Walsham 1993) from which the key dynamic is *negotiation.* The approach they call responsive evaluation seeks to reach consensus among stakeholders on all various claims, concerns and issues. It acknowledges the fact that different people may hold different values and ideas on a certain phenomenon and therefore evaluate it differently; the approach therefore accommodates *value-pluralism.* A perspective on evaluation as negotiation process has also already been recognised earlier (Land 1976).

Adopting such a stance means quite a radical move away from the conventional evaluation practices since it substitutes *relativity* for (alleged) *certainty*, since there is no objective truth on which inquires can converge; *empowerment* for *control*, since multiple (possibly conflicting) interests and values are taken into account; and *local understanding* for *generalised explanation*, since it denies the assumption that (social) reality is based on well-established cause-effect relationships. But, Guba and Lincoln argue this radical move is necessary if we accept the basic premises of the constructivist paradigm[12] in favour of the conventional paradigm; that is to accept that no generic or universal solutions can be devised for social problems through denial of generalisation and simple, linear cause-and-effect relationships. Responsive constructivist evaluation instead argues that the constructivist paradigm can help to find and support solutions for situated, local problems.

"[A]ll these fears – about the loss of absolutes on which to pin our hopes, about intolerable ambiguity, about the loss of experimental and political control, about our

[12] It can even be argued that Guba and Lincoln (1989) adhere more to the critical paradigm in the way they try to emancipate evaluators from their entrapment within the conventional paradigm. However, their proposed responsive evaluation is based on negotiation to come to a shared understanding of the evaluant, and thus leading to consensus, which is a different view from what a critical paradigm might advocate in viewing evaluation as political instrument (possible as an instrument of domination).

inability to find widely useful solutions to our pressing problems – are themselves only *constructions* in which their constructors are trapped because of their rigid adherence to assumptions that have patently outlived their utility and their credibility. It is precisely because of our preoccupation with finding universal solutions that we fail to see how to devise solutions with local meaning and utility. It is precisely because of our preoccupation with control that we fail to empower the very people whom we are putatively trying to serve" (Guba and Lincoln 1989, p.47).

As can be seen from Table 3.2 the shift to a constructivist paradigm also means a radical break from the conventional beliefs on evaluation (also see section 2.2.3).

Theorem on	CONVENTIONAL	CONSTRUCTIVIST
Nature of evaluation	Evaluation is a form of scientific inquiry and hence has all the attributes of that genre.	Evaluation is a form of constructivist inquiry and hence has all the attributes of that genre.
Values and evaluation	Evaluation produces data untainted by values. Values are intrusive to the evaluation process and distort scientific data by, for example, biasing them.	Evaluation produces reconstructions in which "facts" and "values" are inextricably linked. Valuing is an intrinsic part of the evaluation process, providing the basis for attributed meaning.
Accountability	Accountability can always be assigned because it is determinable via the relevant cause-effect chain.	Accountability is a characteristic of a conglomerate of mutual and simultaneous shapers, no one of which or one subset of which can be uniquely singled out for praise or blame.
Objectivity of evaluation findings	Evaluators can find a place to stand that will support the objective pursuit of evaluation activities.	Evaluators are subjective partners with stakeholders in the literal creation of evaluation data.
Function of evaluators	Evaluators are the communication channels through which literally true data are passed to the audience of evaluation reports.	Evaluators orchestrate a negotiation process that aims to culminate in consensus on better-informed and more sophisticated constructions.
Legitimacy of evaluation findings	Scientific evaluation data have special legitimacy and special status that confer on them priority over all other considerations.	Constructivist evaluation data have neither special status nor legitimacy; they represent simply another construction to be taken into account in the move toward consensus.

Table 3.2 Contrasting theorems from conventional and constructivist belief systems specific to evaluation, based on Guba and Lincoln (1989, p. 109 – 111).

An interpretive approach to IT evaluation is supported further by Serafeimidis (1997), who employs the concepts of *content, context* and *process* of the evaluation (Pettigrew 1990; Farbey, Land *et al.* 1993; Symons 1994). Thus the scope of conventional evaluation methods is broadened to go beyond just the content of the evaluation and to include also the context in which the evaluation takes place (e.g.

external environmental and internal organisational factors) and the process by which the evaluation is performed. Interpretive researchers thus claim that an interpretive approach to evaluation would be more appropriate than the narrow traditional evaluations, if the aim of the evaluation is to generate real understanding of the costs and benefits of a computer-based system and its human and organisational consequences (Walsham 1999).

So both from a practical point of view (e.g. hard to quantify intangibles, the favouring of quick-return projects, the lack of consideration for typical characteristics of IT projects, etc.) as well as from an ontological point of view (information systems are primarily social systems, not technical systems which can be evaluated in an unbiased, value-free and objective way), objections are raised against applying traditional methods to evaluate IT. A *critical theoretical perspective* adds still another critique.

3.2.7 Critical view on IT evaluation

Lyytinen and Klein (1985) propose applying the critical theory (based on the critical paradigm) of Jurgen Habermas to information systems instead of the natural scientific research theories which have dominated IS research. They stress the importance of the social characteristics of information systems, the recognition of IS development as social act, the *emancipation* of individuals and interest groups, the *participation* of all stakeholders in IS development decisions and processes and the need for achieving *consensus* in the goals of IS development through extensive communication. Critical theorists argue that people cannot fulfil their potential owing to constraints imposed on them by prevailing systems of economic, political, and cultural authority, constructed both socially and by material conditions (Orlikowski and Baroudi 1991; Ngwenyama 1991). Where interpretivism seeks understanding of the phenomenon through description, critical studies consider inequalities and power relations within organisations. They propagate emancipation of all individual stakeholders from prevailing systems. In the case of IT evaluation this can, for example, mean that all stakeholders are given a genuine chance to express their arguments and views on the phenomenon under evaluation and that all of these be regarded as equal partners. A *joint* understanding with a consensus between *all* stakeholders concerned with the phenomenon is the ultimate goal.

Critical theory, in addition to the critique of an interpretive view, adds a critique concerning the inability of the methods to capture an independent reality. Instead, they create taken-for-granted images of the world. Critical theory argues that there is no such thing as an independent economic reality, but evaluation and accounting methods and practices are *creating* that reality (Power and Laughlin 1992). In their simplification and representation of the world, they create an image of the world which to decision-makers can become reality. Moreover, critical theory argues that evaluators are not value-free or neutral, but exist in the broader social context of the organisation. An evaluation is the reflection of the evaluator's beliefs and assumptions. It presents his or her point of view, values and criteria in a specific way of capturing and describing reality. Furthermore, the evaluator is limited by his / her mental inability to capture and understand the rich and complex context of the situations and so is forced to simplify reality in models. Evaluation is therefore a partial and subjective view of the reality of a situation as seen by the evaluator at a specific point of time.

Since information from evaluations is used for decision-making purposes, critical theory adds that it can become an instrument for organisational politics. Moreover, it argues that evaluation practices and methods can obscure the actual personal objectives pursued by decision-makers behind a rationalised myth and the overt organisational goals (Knights and Murray 1994). Ritualistic use of discounted cash flow methods can, by supporting powerful interests, become a device to suppress the less powerful in organisational terms (Walsham 1999). It is however questionable, as Carruthers (1995) demonstrates, who is suppressing whom through the rationalised myth. For instance, is it the financial specialists who by their (institutionalised) background adhere more to the methods, and let such methods influence their worldview and actions? Or by contrast, is it the non-specialists who are fooled, and the financial experts who through their experience appreciate the malleable, ambiguous and political nature of the methods? Maybe both groups are by the formal rational method decoupled from actual organisational practice and are only maintaining appearances to the outside by symbolically reproducing rationality (Meyer and Rowan 1991; Carruthers 1995) or maintaining their own sense of security (Knights and Morgan 1991).

McCabe, Knights *et al.* (1998) discuss from a critical perspective a case study where the concept of Total Quality Management (TQM) is introduced in an organisation. TQM is introduced by management to unite the organisation and secure employee commitment. However, their main argument is that TQM can be used to transform social relations. But it does so based on existing social relations. Consequently, while addressing some problems, TQM reconstitutes organisational inequalities and existing power relations. In doing so it (re)creates many of the problems it is intended to resolve. TQM is usually depicted as a moral and politically neutral set of techniques to manage an organisation more effectively by improving the quality of its products and services. The researchers however argue that TQM does not remove organisational politics. As it resolves older tensions, it in fact creates new political anxiety and stress. TQM promises empowerment, but instead gives a rationale for cost-cutting and labour-saving, thus resulting in employment insecurity.

In the case study of a medium-sized UK, Bank McCabe, Knights *et al.* (1998) show that TQM is to blame for anxiety in job security because TQM goes hand in hand with restructuring (and lay-offs). This results in tensions in the organisation, creating an atmosphere where people (as understood from a critical political point of view) try to survive and start blaming each other for inefficiencies. The case shows that TQM only works in this company for the people who do not have to be afraid of unemployment. The people who are in a more uncertain position try to make it more secure by only doing the work that is demanded of them, and trying not to accept extra responsibilities from the people who are in the better position.

A similar analysis of the concept of Activity-Based Management (ABM) has been given by Armstrong (2002), which aims to treat staff activities in routine functions for particular cost-objects, usually products. The framework encourages the stripping-out of all staff work which cannot be accommodated within its defined activities or the language of accountability imposed by ABM. This holds the threat of limiting or downplaying non-routine initiatives aimed at competitive advantage, such as human resource management or marketing. Moreover, due to its cost-cutting focus, ABM can have negative consequences with regard to employment security.

We argue that similar reasoning can be applied to the introduction of improved IT cost/benefit management through the employment of a new IT evaluation method. The introduction of a new IT evaluation method changes employees' roles, responsibilities and commitments and thereby disrupts the "secure identities and positions they have created for themselves" (Knights and Murray 1994). It can also be seen as an indirect threat to employment security, since improved cost management can result in reductions of staff. Pfeffer (1981) argues that changing monitoring and evaluation instruments in organisations can lead to changes in existing power distributions leading to political unrest.

One could think that the politics practiced, owing to employment insecurity by the employees in the TQM case, are undesirable and should somehow be eliminated. This assumption is a very common one in managerial literature. For example, Boar (2001) argues that "by far, the most difficult barrier to overcome is organisational politics. [...] Politics is a hard reality for the strategic change agent. [...] Better to protect and defend 'what is' rather than be at the mercy of the change agent, or should we say the 'annihilator.' [...] To overcome politics and the inertia to action it causes, persuasive arguments that transcend the ability of the factions to resist must be developed" (ibid, p. 259 – 261).

But these politics are not unfavourable, so argue the critical researchers (McCabe, Knights *et al.* 1998), but a rational and central activity "and beneficial for organisations: it is through political manipulation and manoeuvring that individuals are able to secure their sense of self and identity. In doing so individuals may derive meaning from their work that could otherwise be absent. Critically, such expressions of self may serve to curb more violent forms of resistance should management attempt to remove them" (ibid, p. 123). The researchers conclude that TQM either has to be accepted as a concept that will not deliver its promises and therefore should not be employed, or TQM should be extended to take into account the issues of power, structure, inequalities and (employment) security as well.

In the field of evaluation, interpretive and critical studies promote deeper understanding by the stakeholders of the object under evaluation and do so by stimulating discussion among stakeholders (Guba and Lincoln 1989, Avgerou 1995).

Critical theory however goes further, acknowledging the existence of political inequalities and barriers between stakeholders. Though critical theory does not pose a solution to break down these barriers, it does stimulate an explicit and critical reflection on these inequalities. Thus, it perceives this recognition of inequalities to be a first step in the right direction of emancipation (Walsham 1993). It should however not only uncover that such inequalities, dominant ways of thinking or taken-for-granted assumptions exist, but also question what, how and why they have become purposive and how and why they are being or are about to be used in a particular context (Lodh and Graffikin 1997). It should question the power structures, which maintain the *status quo* and "open the 'black-box of' information technology and scrutinise the power relations inscribed within it which may repress or constrain" (Doolin 1998, p. 307). A critical approach to evaluation should show how particular technological outcomes or evaluation methods define and stabilise particular representations of organisational reality (Doolin 1998). A critical perspective does not offer 'better' evaluation methods, but a word of caution concerning the worldview presented by any IT evaluation method employed.

3.2.8 Conclusion on evaluation

Patton gives a nice summary of the arguments on evaluation as presented in this section. Based on six different current practices of evaluation that vary in emphasis, (evaluation tied to goals; evaluation tied to scientific methods; evaluation as comparing alternatives; judgments based on evaluating value; evaluation as generating data for decision-making; evaluation as information providing to users), he concludes that (Patton 1987, p.106):

- no single-sentence definition will suffice to capture fully the practice of evaluation;
- different definitions serve different purposes;
- there are fundamental political disagreements in practice on the essence and boundaries of evaluation – different perspectives involve different values;
- people who propound a particular definition often have some ego investment in their special perspective;
- outsiders are confused and uncertain about just what evaluation is;
- there is no reason to expect an early end to either the disagreements or the confusion.

Thus, when talking about evaluation, the actual meaning of the term depends heavily on its use, context and interpretation by the people involved. This conclusion is important while gathering and analysing the case study results. Due to the many aspects that are understood by evaluation, there is no 'right' way to define evaluation. The definition of evaluation is a human mental construction whose correspondence to some 'reality' *is not* and *cannot* be an issue (Guba and Lincoln 1989, p. 21). IT evaluation can thus be said to be socially constructed.

Within the field of IT, the (social construction of) evaluation has evolved from a shift in focus from costs to investment; from financial methods to more comprehensive methods that capture intangible aspects as well; from project appraisal to full life cycle management; from evaluation concepts that were focused on the technical and economical evaluation results, towards evaluation concepts that also focused on the social aspects; and moreover regard the evaluation process, the evaluation context and political implications to be important.

This is reflected in the development of evaluation methods. Based on contemporary insights, a comprehensive evaluation method should address a rich content (tangibles, intangibles, risks), the notion of life cycle evaluation (e.g. manage costs and benefits throughout the various stages of IT investments), contingency considerations (e.g. apply a broad spectrum of criteria to capture the wide range of costs and benefits of different types of IT investments) and contextual considerations (e.g. broaden the scope beyond the investment itself and recognise that it influences organisational roles, responsibilities and decision-making) (Farbey, Land *et al.* 1993; Serafeimidis and Smithson 1999). Furthermore, it should be supported by tools and techniques and identify relevant stakeholders who should be involved in the evaluation process.

3.3 THE EMPLOYMENT OF IT EVALUATION

3.3.1 Introduction

In this section, we will approach the employment of IT evaluation from three different angles: experiences with IT evaluation processes, experiences with IT evaluation results and experiences with IT evaluation methods. One common aspect shared by all three angles is that evaluations do not happen very often. We discuss the different reasons researchers have found for this phenomenon. Then, in the next section, we will discuss the different theories on organisations and organisational change in order to arrive at a deeper understanding of the processes involved in employing evaluation methods in organisations.

3.3.2 Experiences with evaluation processes

Although "everybody does cost / benefit analysis on projects, most of them are fictional" (Farbey, Land *et al.* 1993, p. 154). This citation illustrates a common experience with evaluation processes. Powell (1999) notes a number of motives for organisations not to evaluate. Among them are:

- firms not having clear objectives and thus lacking a yardstick against which to evaluate;
- projects being labelled strategic or must-do, which therefore may not be deemed necessary to review;
- IT projects often not being critically viewed if they in fact are necessary because "the forces for computerizations are such that the alternative of doing nothing is not often considered" (ibid, p. 173);
- costs not dominating, for example in financial industries, where the costs are small compared to the financial operations the system might support, or in government, where budgets and subsidies form 'easy money' which does not need evaluation;
- difficulties in evaluation due to changing requirements; having an aversion to too much cost control because it might have a negative impact on overall performance;
- difficulties in getting all stakeholders (e.g. top management) involved in the evaluation process and thereby degrading the value of an evaluation.

Overall, experiences show that formal evaluations (as a process) do not happen very often. This can be seen to be true for all different types of evaluations throughout the life cycle (see section 3.2.1). At the *proposal / feasibility stage*, many researchers report on managers making decisions based on instinct, gut feeling, 'irrationality' and 'act-of-faith' rather than employing a formal evaluation (Farbey, Land *et al.* 1993; Farbey, Land *et al.* 1999a; Remenyi, Money *et al.* 1993).

At the *development stage*, there is an abundance of literature pointing to the poor evaluation of projects that make projects run out of time and budget (e.g. Genuchten, Heemstra *et al.* 1991). In fact, IT projects are notorious for costing twice as much and taking twice as long as initial estimations often show (e.g. Siskens, Heemstra *et al.* 1989). Research shows that the use of methodologies for system development, which could assist in monitoring and evaluation, are uncommon and show mixed results at the organisations that do use them (Kautz and McMaster 1994; Chatzoglou 1997; Beynon-Davies and Williams 2003).

Lack of evaluation at the *post-implementation stage* seems not to have changed much over the last few decades despite many researchers pointing to the benefits of it. Research from 20 years ago until very recently describes the same situations: managers generally do not make *ex post* evaluations (Farbey, Land *et al.* 1999a; Remenyi, Money *et al.* 1993; Berghout and Nijland 2002). Although many managers acknowledge the advantages for *ex post* evaluation, common excuses for not carrying them out include (Remenyi, Money *et al.* 1993; Farbey, Land *et al.* 1993; Nijland 2000):

- "if the investment appraisal during the proposal / feasibility stage was conducted correctly, the results should be automatically delivered – ex-post evaluation then is a waste of time";
- "the complex results of IT projects cannot be disentangled from other business activities or general noise in the environment";
- "to act as an auditor or policeman is inappropriate in the organisation and will produce negative feelings among the staff towards IT";
- "the costs for evaluation and measurement are too high in relation to the expected results received";

- "nothing can be learned by evaluation. If the investment already is made, nothing can be done about it. New investments have their own characteristics and difficulties";
- "people responsible for the justification have already left";
- "it is too early or too late for evaluation – the benefits did not appear yet, or already have been negated by other developments".

Researchers acknowledge these difficulties: *ex ante* and *ex post* evaluation are in fact *not* 'two sides of the same coin' in so far that a coherent evaluation plan before development would enable evaluation after development (as was argued in Farbey, Land *et al.* 1993), but rather *ex post* evaluation should take into account the environmental changes of the investment (Farbey, Land *et al.* 1999b). Investments do not occur in a stable world. The right question is then "Are we achieving the best we can with this system in the current circumstances?" rather than "Are we achieving what we set out to do with this system and to what degree?" (Farbey, Land *et al.* 1999b, p. 247).

Finally, formal evaluations on the benefits and burdens of operational IT at the stage of routine operation are also uncommon (Klompé 2003). Business mangers and executives commonly intuitively know that operational IT returns value. However, what additional benefits can be gained from operational IT is not commonly assessed (Ward and Peppard 2002).

If, however, organisations do perform an evaluation, frequently the results of the evaluation are not used, as we will discuss in the next section. Here there is interdependence between the results and the process of evaluation, since the limited use of the results of evaluations diminish the motivation to carry out future evaluations.

3.3.3 The use of evaluation results

There is strong evidence that evaluation results in many cases are not used by administrators and managers (Patton 1978; Legge 1984). This is especially the case if findings are contrary to the existing beliefs of the decision-makers. Legge talks about "the crisis of utilisation" (Legge 1984, p.6). She argues that the crisis reflects a

deeper-rooted problem – the question of what functions an evaluation design can and should fulfil. She assumes that if managers and administrators are to use evaluation findings, these findings must fulfil whatever function they require of the evaluation. Findings are not utilised, she argues, since they are frequently addressed to people who are not directly involved in the subject of the research, or to people who have political reasons to accept a certain outcome only. Guba and Lincoln (1989) add that the receivers of the evaluation results sometimes lack the power or resources to act in a meaningful way. Other reasons include managerial turnover (people who initiated the evaluation research have left the organisation before it is presented), evaluators who are producing results that are too academic in that they do not answer the questions in which decision-makers were really interested, or which come too late or are trivial and only provide information that those involved knew anyway, at least instinctively (Legge 1984).

Covert reasons include that evaluators may only seek approval of their work from professional colleagues, or seek only results that satisfy their own research interests. On the other hand, the managers involved may not have wanted the evaluation to take place at all, fearing that the evaluation may expose a failure or increase accountability. These reasons frequently denote the findings of evaluations as 'irrelevant'. Moreover, another major contribution strengthening the crisis of utilisation is that different people involved in the evaluation will require different overt and covert functions of the evaluation – most likely conflicting ones. Each of the functions requires different information to be gathered. Only by providing this information does the chance of the evaluation results being used improve.

To understand the crises of utilisation further, Legge suggests looking at the definition of utilisation. She argues that the crisis of utilisation in many cases stems from a "*disillusionment about the utilization* of evaluation research, rather than its *actual utilisation*" (ibid, p. 199, original italics). The common evaluation researcher's commitment to *positivistic* research designs leads them to define utilisation in terms of 'dramatic impact', rather than 'gradual influence'. Legge concludes that "if utilisation is defined as having *gradual* impact, rather than *dramatic* impact on decision-making, utilisation *does take place.* Evaluator's concerns that their research findings were not utilised, at least for overt informational

purposes, can be seen to have arisen from their unrealistic expectations about the nature of much decision-making and of the potential impact of research findings in that process" (ibid, p. 198). To test if 'utilisation occurred' in case one accepts the impact to be gradually influential, is a hypothesis that neither can be proved nor falsified. It relies on respondent's opinions and attributions of how the evaluation influences their own and other's intellectual thought processes.

In a similar way, Bannister and Remenyi (1999) argue that evaluation results are only one of the many inputs in the process of evaluating IT. The evaluation process actually entails "the absorption of a range of input information including data, evaluation techniques, personal experience, personal knowledge, corporate or departmental politics, personal desires and intuition". Thus the impact of the evaluation results, be it dramatic, gradual or none whatsoever, very much depends on the hermeneutic process by which individual decision-makers filter and distillate the different sources of (often complex) data, information and knowledge.

With respect to the crisis of utilisation, Legge thus argues convincingly that a positivistic (conventional) stance cannot be upheld (Legge 1984). If one holds to it, seeing the number of evaluations not used (in an 'overt sense') would have to convince positivistic evaluators that what they are doing is not worth while. On the other hand, if they redefine utilisation as having a gradual influence in the minds and thinking of people, rather than dramatically shaping decisions, they would have the problem of 'falsification'. Knowing if evaluations have been utilised could not be verified or measured, but could only be appropriated by interpretation. That situation is incompatible with the positivistic paradigm.

The influence of evaluations can be facilitated by getting "the appropriate information to the appropriate people in an appropriate form and at an appropriate time" (Legge 1984, p. 198), which in itself might be self-evident, but how to implement this is not. Important aspects in implementation include the identification of relevant decision-makers and users of the evaluation, the usefulness of information (with regards to the relevancy, adequacy and persuasiveness), effective communication of findings and the so-called 'personal factor' (Patton 1978). This factor denotes the enthusiasm of both the potential users as well as the evaluators of

the evaluation and the part they take in conceptualising and designing the evaluation study as well as their interest in the focus of the evaluation (Legge 1984, p. 181 - 198).

3.3.4 Influences and difficulties in employing IT evaluation methods

Apart from the reasons why formal *evaluation* is not often employed (see section 3.3.2), research in IT evaluation shows that evaluation *methods* are not employed widely for IT evaluation (see section 1.1.4). Given the fact that evaluation is considered important and that evaluation methods are employed in other fields, are recognised as useful (Powell 1999) and can bring within reach a large number of benefits (see section 3.2.1), why is that organisations seem to have trouble employing IT evaluation methods? Though not previously researched, several studies hint at possibilities as to why this employment is so difficult.

With regard to the evaluation method, various studies indicate how a method should be constructed or what characteristics it should have to be considered for employment by an organisation. One of the most common reactions to organisations finding it difficult to evaluate is to blame the contents of the method. It could be argued then that by 'improving' the method it will be employed more easily. For example, Clermont states that a traditional methodical approach to IT cost-justification have two characteristics in common: the first characteristic is that they are financially oriented, using financial techniques such as return on investment or net present value to evaluate investments, and the second characteristic is that all of them 'only work in theory' (Clermont 2002).

Suggestions for improvements in the contents, covered in the previous section (see section 3.2.5), include adding more criteria (e.g. measure risk in addition to costs and benefits; measure *intangibles* also), defining better what is meant by certain definitions (e.g. have a new definition of how the *value* of information can be measured), extending the scope of the method (e.g. to include life cycle evaluation) and shaping the method to certain contexts or types of information systems (e.g. use different criteria for different types of organisations or information systems).

Rather than constructing the 'ultimate best' evaluation method, some researchers argue that one singular method cannot comprise the range of applications covered by IT. Therefore, they suggest selecting the appropriate method depending on the particular type of IT application considered (Farbey, Land *et al.* 1992; Farbey, Land *et al.* 1995). However, this approach seems to be fraught with further difficulties in terms of employing IT evaluation.

By contrast, Serafeimidis and Smithson (1995a) from a case study of introducing an evaluation method in a UK insurance organisation make some suggestions for considering not only the content but also the *context* and *process* of the evaluation. An important argument they add is that the evaluation method should fit with the culture of the organisation. The evaluation process "should take on board the fundamental values of the organisation" (ibid, p. 224) to prevent it being dismissed as 'counter-cultural'. In other words, the criteria used to demonstrate or measure the value of the investments should reflect the values of the organisation. For example, organisations in which innovation is considered important will have different criteria than organisations that regard optimising costs and benefits of paramount importance. Therefore it seems necessary to understand 'who' or 'what' is the source of the values represented in the evaluation method. The method, they argue, should strive to have criteria on which key stakeholders hold (some) consensus. Moreover, if an organisation is used to using very formal financial methods for project justification, it cannot be expected to employ suddenly a much richer and more sophisticated method (e.g. one that includes intangibles, risks, etc.), without undertaking the process of organisational change involved (Serafeimidis and Smithson 1995a, p. 226).

Similarly, organisations that are used to measuring will appreciate different methods than organisations that are used to discussing. According to Serafeimidis and Smithson when the method fits with the way things are currently being done, it has a better chance of being used . One of the reasons for the lack of success in their case study is the difficulty of *shifting paradigms* (Serafeimidis and Smithson 2000). A turnaround from traditional accounting techniques to the holistic evaluation paradigm (i.e. including intangibles and risks) represents a significant change in the underlying concepts and values. The advanced evaluation approach is faced by the existing

culture, based on the previous (formal-rational) paradigm. The argument for the poor acceptance of the evaluation method can thus be viewed from an institutional point of view, arguing that cultural inertia may be constraining this acceptance (Orlikowski and Barley 2001). Although the new method might be beneficial, the social and cultural traditions of using traditional accounting techniques have to change before the new method is accepted.

Thus Serafeimidis and Smithson (2000) identify the size, or more precisely the strength of the institutional practices, of an organisation to be an important obstacle in changing evaluation practices. Due to the large size of the organisation and its formal and bureaucratic culture, changes are unlikely to attract support easily. Applying the notion of structuration theory (Giddens 1979 – see section 3.4.3), they argue that majority of the organisation in their case study continued with their existing practices, thereby reinforcing the existing structures of values and beliefs (the traditional paradigm), which in turn supported the existing practices. The need for a change was not universally felt in the organisation. Most managers and staff saw no reasons to change, arguing "if it ain't broke, don't fix it" (ibid, p. 102).

To continue, Serafeimidis and Smithson (2000) identify a change in the roles of stakeholders involved in the evaluation when a shift in evaluation methods occurs. For example, accountants may feel their traditional position being undermined, while system developers and business managers do not welcome the increased responsibility and accountability involved in the new form of evaluation. Thus, the change in evaluation approach may upset a delicate long-established political balance. The dominance of existing accounting practices preventing organisational change has also been presented in other cases (e.g. Larringa-Gonzalez and Bebbingon 2001). Changes in responsibilities, tasks and roles concerned with evaluation may strengthen the insecurity of those involved and thereby invoke resistance or lead to conflict. Case studies show that additional 'political' means to support investment proposals are employed by business sponsors when methods are being used to divide resources and prioritise them (Serafeimidis and Smithson 1995a). Apparently, in employing the method, changes in the way resources are divided and the business sponsors' ability to influence that should be taken into

account. Simply, the argument is that the method should fit the organisational politics.

Regarding the social acceptance of the method, some researchers stress the importance of evaluation methods not being too complex in use (e.g. Irani and Love 2001). Simple tools, such as tick-lists (Serafeimidis and Smithson 1995a), are preferred over complex calculations or detailed inquiries. This reduces the efforts and time required by the users of the method and increases the chances of the method being employed.

Related to this is the consideration that the terms used in the method should be clear to all users and have a common definition. Serafeimidis and Smithson (1995a) found that in the process of evaluation method employment confusion about the interpretation of terms used in questionnaires, checklists and spreadsheet models arose when they were not clearly defined. People interpreted them in different ways. Though people will always have their own interpretations (Boland 1985), clear definitions of terms will prevent too widely diverging interpretations. In fact, "the weak support and training of the users to use the tools" was claimed to be the most important reason for the limited success in employment of the evaluation method (Serafeimidis 1997, p. 143).

However, there is also another reason that is considered primary to its limited success. Serafeimidis and Smithson (1995a) argue that in their case study a lack of support from corporate level and senior management accounts for a limited success of the evaluation methodology. The failure to obtain the agreement of the finance director in the organisation led to the effect that the evaluation method was disregarded by the finance division and consequently also by the marketing division. This ultimately led to the evaluation method being discarded.

Moreover, an evaluation method that has the appearance of being too IT focused can lead potential users to be biased against it and fail to view it as the *decision-making* tool it was designed to be (Serafeimidis and Smithson 1995a, p.229). It thus stands the chance of being pushed aside (Land 2000). For better acceptance, these researchers argue that the evaluation method should be perceived to be worthwhile

by the business managers rather than IT managers. Undertaking the employment as a business initiative rather than an IT initiative contributes to that. In addition, Serafeimidis and Smithson (1995a) in the design of an evaluation method promote a considerable programme of persuasion and confidence-building to convince all relevant stakeholders of the necessity to include risks, intangibles and strategic outcomes in the evaluation method.

In conclusion, Serafeimidis and Smithson (1995a) provide a number of recommendations in the management of changes introduced by the employment of an IT appraisal method. First of all, identify the expected impacts of the change introduced and propose remedial actions for anticipated problems and conflicts. This should include an investigation of the political and social dimension of the change. Secondly, ensure the support and commitment of management. Serafeimidis and Smithson (2000) argue that perhaps if senior management had provided more support to facilitate the needed shift in paradigm and its underlying beliefs and values, a more successful outcome could have been obtained. Related to this support is the recommendation to have a 'champion' that is committed to the employment of the method. Similarly, Farbey, Land *et al.* (1999b) point to the critical role of the project manager involved in introducing appraisal and evaluation processes. Thirdly, investigate how well the method is supported by existing organisational and IT infrastructures. Shaping the evaluation method so that it fits previous organisational practices in the areas of project management, IT development methodologies, financial appraisal and capital investment appraisal can alleviate problems that originate from an inability to integrate the new approaches with the existing ones (Serafeimidis and Smithson 2000).

Other researchers have noted additional influences in the employment of evaluation methods. Ballantine, Galliers *et al.* (1995) argue that the *degree of consideration for the process of appraisal* and evaluation is important for the employment of a method. Organisations with little consideration for this process are not likely to use an accounting model (such as NPV, payback or ROI) or use only a standardised one, whereas organisations with in-depth considerations of this process will adhere to methods that account for specific IT characteristics. Moreover, the organisation must have the *resources* to evaluate, as well as the desire to commit to them. Ballantine,

Galliers *et al.* further argue that organisations that see themselves as followers of particular trends in technology are not inclined to employ sophisticated evaluation methods. They rely on leading organisations (e.g. *early adopters* - Rogers 1995) to evaluate new technologies and will only invest in 'proven technologies'.

Focusing on the context, Farbey, Land *et al.* (1999a) argue that in the climate of recession, severe cost cutting and potential job losses, formative evaluation is not usually employed. On the other hand, Ballantine and Stray (1998) assert that in the need for cost containment resulting from recession, companies are more likely to appraise projects. This seeming contradiction can be explained by the notion that formative *ex post* evaluations are unlikely in recessions, but thoroughly analysed *ex ante* evaluations are required. In fact, *ex post* evaluations can be seen to be suppositious, irrespective of the *economic climate* (Van Eekeren and Nijland 2003), whereas *ex ante* evaluations seem to be promoted by scarcity of resources, be it financial (in economic lesser times) or IT capacity (in economic better times). Still, external factors such as the national economic situation, national and local government policy, markets and market demands, competition, supplier availability and expertise and other environmental pressures can be argued to influence the employment of the evaluation method (Serafeimidis and Smithson 1995a).

More generally speaking, apart from IT evaluation specific attributes, a large number of aspects stemming from both organisational research and common sense logic can be seen to influence the degree to which an evaluation method is successfully employed by an organisation. Studies on the employment of information systems, system development methodologies, management techniques and account techniques offer a plethora of suggestions concerning the elements which influence the potential for success (e.g. Smith, Cohen *et al.* 1989; Wilson 1991; Kautz and McMaster 1994; Miller 1997; Premkumar, Ramamurthy *et al.* 1997; Plouffe, Hulland *et al.* 2001; Aladwani 2002; Ballantine, Bonner *et al.* 1998; Gosselin 1997). As such, the reasons for evaluation employment to be so problematic can be argued to be related to:

- the *method* (e.g. its content, the object of evaluation, the criteria in use, employed timeframe, people involved in its construction, supporting tools, outputs it provides, compatibility with organisational and technical infrastructure, ease-of-use, etc.);

- the *organisation* (e.g. culture, structure, management procedures, decision-making procedures, organisational procedures, other financial, budgeting and accounting methods, business strategy, IT strategy, etc.);
- the *people* involved (e.g. management support, characteristics of the stakeholders, the project team members involved in the implementation project, a project-champion, etc.);
- the *process* and project of implementation (e.g. project management, project planning, order of actions, available resources, etc.);
- the external *environment* (e.g. pressures, opportunities, organisational priorities with respect to other issues, impulse or reason to change, institutional context, etc.) and
- the *gap* between current and future situation (e.g. a gradual and incremental change versus a radical change).

This list undoubtedly can be expanded and viewed from different analytical levels (from micro to macro levels; from individual to organisational, to societal levels). However, that is not the aim of this research. Neither is the aim to test which reasons are influential and which not. Most likely, all of the reasons mentioned, plus a great number not yet identified, will affect the employment. The degree to which they are relevant is highly situational and contextual.

Suggestions for a more interpretive approach to IT evaluation methods have included recommendations to go beyond the contents of the method and incorporate the context and process of the evaluation (see section 3.2.6) and include some of the notions discussed in this section. However, such academic literature on enhanced organisational evaluation practice has so far not been influential (Willcocks 1996a). In a few cases, more comprehensive evaluation methodologies have been tried. The results however showed that these methods also fell into disuse (Serafeimidis and Smithson 1995a).

In sum, evaluation methods, other than the traditional financial ones, are uncommon in organisations. Moreover, somehow none of the suggestions presented in this chapter, as far as they have been tried, seem to have led to improved employment of IT evaluation methods. The object of our research then is to deepen our

understanding of the employment of IT evaluation methods in organisations and thereby offer new explanations of the problems related to this process.

3.3.5 Conclusion on employment

The literature on the employment of evaluation does not show an encouraging picture. Evaluation processes are hardly being employed, evaluation results are disregarded and evaluation methods are not used. Despite all of the suggestions in the literature on different ways to improve employment of evaluation methods, there is no evidence that they are being employed in a successful way. However, some arguments were presented as to how these results can be understood. Notably, the work of Legge (1984) contended that maybe our understanding of employment is too black and white. Expecting but not finding the radical impacts, we are blinded to see the gradual but nonetheless influential impact evaluation has in organisations. Maybe we are too quick in classifying evaluation employment attempts as 'failures' or 'successes' (see section 1.2.2).

We contend that our understanding of the process of IT evaluation method employment is currently simply too narrow to answer the question why it seems to be leading so often to results that were not contemplated. By an in-depth case study we hope to shed light on this issue.

3.4 ORGANISATIONS

3.4.1 Introduction

To understand the adoption of IT evaluation concepts in organisations, we should have a clear idea about what organisations are and how they behave. In our daily lives as researchers, students, managers, workers or consumers, and all our other circumstances of our social life, we realise that we are a part of an organised world. We experience organisations as systems of implicit and explicit rules which are oriented toward an (often unexpressed) purpose (Scherer 2003). These rules communicate behavioural expectations from organisational members as well as to non-members. They contribute to the coordination of activities for a variety of objectives, which an individual often cannot achieve on his or her own. Especially in

economic terms, the objective of production and distribution of products or services can be achieved only by a division of labour where people depend on organisation(s) for coordination of their operations and actions. Such coordination is not an easy task, neither is it an automatic achievement. Organisation theory offers many different, sometimes conflicting, views how the phenomenon 'organisation' can be considered. One common assertion is that organisations are highly complex entities, dealing with a great number of relevant issues with regard to their creation, existence, functionality and transformation. Moreover, these issues can be viewed from different perspectives and from different paradigms as described in section 2.2.

To improve our understanding of IT evaluation in organisations, in this section we explore different conceptualisations of organisations. By acknowledging differences in what organisations are and how they behave (for example in organisational decision-making), we aim to avoid a constricted view of the phenomenon under study. Discussing current insights and issues in organisational theory, we broaden our understanding of the process of evaluation employment that takes place in an organisational environment.

Clearly the literature on organisations and understanding what they are, what their behaviour is, how they function and what they are made of is abundant and too broad to discuss in detail in this thesis. To understand how organisations behave, a selection of relevant literature on organisational behaviour and organisational change is discussed. The scope of this section is set by two dualities that seem most relevant and have been the topic of many organisational debates. It concerns the debate between agency and structure and the debate between planned and emergent change. Furthermore, we zoom in on organisational decision-making, since IT evaluation is so closely linked to that, and discuss the literature on rational versus irrational behaviour of organisations (and managers). To learn more about what organisations are, a short discussion of organisational metaphors is presented.

3.4.2 Images of organisation

To understand how organisations handle IT evaluation concepts, it is important to have an understanding how organisations 'work', how they behave and react to new

concepts. One view is that organisations can be 'many things at once'. A renowned work on theoretical views of organisations comes from Morgan (1986) who describes organisational metaphors as a means to think about organisations. Organisations are complex phenomena that can be understood in many different ways. Metaphors enable us to see and think about them from different perspectives. "The use of metaphors implies *a way of thinking* and *a way of seeing* that pervade how we understand the world generally" (ibid, original italics, p. 4). Metaphors, by making implicit and explicit assertions between two phenomena, produce insight in distinctive but partial ways. On the one hand, it can help to understand one element of experience in terms of another, but on the other hand, the comparison between the experiences is limited and incomplete. There is even the danger that the way of seeing created through a metaphor becomes a way of *not* seeing, specifically when the limitations of the metaphor are not recognised.

Applying the ideas of metaphors to organisations, Morgan considers eight metaphorical images of organisations as machines, organisms, brains, cultures, political systems, psychic prisons, flux and transformation and instruments of domination. These images have been related to IS research by Walsham (1991).

The metaphors can be applied theoretically to the research question. Each metaphor creates a distinct perspective on the research and related questions and also shapes the possible understanding. For example, seeing organisations as machines, IT evaluation concepts are viewed as *tools* to better *control* and manage IS costs and benefits. The understanding of IT evaluation employment then is framed by the notion that IT evaluation concepts will be employed if they increase the *efficiency* of the organisation and provide better *measurement* of the *real costs and benefits* of IS.

By contrast, applying the organism metaphor to the research question yields the view of IT evaluation concepts as means to better *align* the organisation with its environment. The employment of new evaluation methods can thus be understood as a response to its environment. For example, the notion of institutionalism (DiMaggio and Powell 1991), which can be said to fit with this metaphor, describes the phenomenon of 'copying mechanisms' from other organisations. Such mechanisms could explain why certain organisations make an attempt to employ new evaluation

methods, namely as a mimic process of other organisations that already have employed such methods.

Yet another view on organisations, that of the political metaphor, entices the perspective of organisations as political systems. IT evaluation concepts can then be perceived as means to uncover *hidden agendas* or to create win-win situations for all *stakeholders* involved. Table 3.3 shows (simplified) descriptions of the metaphors of Morgan and some different insights they offer in understanding IT evaluation methods and their employment.

Similarly, other ways of understanding can be constructed from other metaphors that are not limited to the eight listed by Morgan. Clearly, each perspective gives quite a different understanding of what happens at organisations when a new IT evaluation method is introduced.

Metaphor	**Machines**	**Organisms**	**Brains**	**Cultures**
Meaning	Organisations operate as machines: different parts form a whole, and operate in a seasoned, efficient, reliable and predictable way.	Organisations are living systems, existing in a wider environment on which they depend for the satisfaction of their "needs".	Organisations are synonymous to their information systems. They create the possibility of organising without having an organisation in physical terms.	Organisations are socially constructed realities that are as much in the minds of their members as they are in concrete structures, rules and relations.
Tends to view IT evaluation method as	... a tool to rationalise decision-making and increase the efficiency of the organisation.	... an opportunity to better align the organisation with its environment.	... a learning device, to bring to perfection future IT investments and prevent repeating mistakes in the future.	... a socially constructed, shared view on the value of IT investments.
Tends to view the employment of an IT evaluation method (the organisational change) as	... 'slotting' the method into the organisational machine.	... shaping the method to make it compatible to the characteristics of the organisation.	... introducing a new knowledge system, and by means of feedback, adjusting it until it provides all the desired information.	... accepting the method by the organisational members, due to its fit with their values, beliefs, norms and social practices.

(Table continues on next page)

Metaphor	**Political systems**	**Psychic prisons**	**Flux and transformation**	**Instruments of domination**
Meaning	Organisations are loose networks of people with divergent interests, concerned with issues such as authority, power and superior-subordinate relations.	Organisations are ultimately created and sustained by conscious and unconscious processes, where people can become imprisoned by the images, ideas and thoughts shaped by these processes.	Organisations are part of their environments and their environments are part of the organisations. Change is an emergent rather than controlled phenomenon. Key organising rules tend to hold organisation-environment relations in a particular configuration.	Organisations should be viewed from an ethical and moral perspective, since they may be intrinsically dominating and used by individuals and groups to impose their will upon others.
Tends to view IT evaluation method as	... way to uncover hidden agendas and conform conflicting interests in win-win situations. It serves the interests of all parties.	...a tool that increases 'rationality' and thereby threatens to downplay the importance of the 'irrational', such as intuition and feeling.	... one of many contributors to the emergent changes in the organisation.	... a narrow perception of reality, institutionalising the dominance of a financial perspective, possibly to the detriment of other (social) perspectives.
Tends to view the employment of an IT evaluation method (the organisational change) as	... a battle, where the method increases the power of some over others.	... changing (for better or for worse) the sense of comfort and security of organisational members, for example in decision-making or in accountability.	... the undermining of the status-quo, which will only succeed if the organisational context is (made) sufficiently receptive to the method.	... imposing a domination instrument on (some) organisational members, who thereby can be 'controlled' and made accountable.

Table 3.3 Understanding IT evaluation methods and their employment, based on (a minimalistic version of) Morgan's organisational metaphors (Morgan 1986; Walsham 1991).

Each metaphor is valuable because it offers new insights. There is no correct or incorrect image of organisation, no all-embracing metaphor, but all are partial, yet valuable. By selecting specific approaches when they appear to be more relevant, we gain richer insight (Walsham 1991). A metaphor in itself can never be normative, only descriptive. It can help to sensitise us to perspectives otherwise overlooked and thereby deepen our understanding of the phenomenon of IT evaluation method employment.

In our research the metaphors of Morgan have been used as initial starting point to think about organisations and the way they might be understood when considering the topic of IT evaluation. The different insights can be seen to have influenced the entire research, ranging from the construction of the research question, the selection

of appropriate theories for understanding (see Chapter 3) and the analysis of our case study.

3.4.3 Organisational behaviour: agency versus structure

In order to understand organisational behaviour related to employing an IT evaluation concept, social theories provide two distinct streams: theories that place their emphasis at the level of human agents and human action, and alternative theories which focus on the structure of social systems (Walsham 1993).

Schools of thought that have been preoccupied with *action* regard social life as an active accomplishment of purposive, knowledgeable actors. Action or agency concerns events of which an individual is the perpetrator, in the sense that the individual could, at any phase in a given sequence of conduct, have acted differently. Whatever happened would not have happened if that individual had not intervened (Giddens 1984). Action depends upon the capability of the individual to 'make a difference' to a pre-existing state of affairs or course of events. Moreover, the actor 'could have acted otherwise' (Giddens 1979).

An interesting action-focused approach is that of organisational psychologist Karl Weick. He describes the process through which humans shape and structure their realities as a process of *enactment* (Weick 1990; Weick 1995). This concept stresses the proactive role people unconsciously play in creating their world. Humans take an active role in bringing their realities into being through various interpretive schemes, even though these realities may then have a habit of imposing themselves as 'the way things are'. Organisations in that sense are in essence socially constructed realities that are as much in the minds of their members as they are in concrete structures, rules and relations (Morgan 1986). Regarding organisational behaviour as an enactment process suggests that the behaviour does not arise merely from organisations compulsively conforming to environmental pressures, but in fact organisations are active in creating and defining some of their own environments. Coordinated action in this view is made possible when organisational members agree on a number of meanings that are flexible enough to allow for local accommodation (Weick 1993).

By contrast, structuralism assigns a priority to *structure* over action. Structure can be understood as referring to a 'pattern' of social relationships. The conduct of actors in society is dominated by the influence of the 'totality' which has characteristics separate from its individual members (Giddens 1979). A prevailing structure-focused approach is that of institutional theorists. They argue that organisational actions are the direct effects of these ideas, values and beliefs that have their origin in the institutional environment of the organisations (Greenwood and Hinnings 1996). Therefore, organisations are compelled, out of necessity, to conform to these environmental prescriptions in order to survive (Bada 2000). A particular resulting process is that of homogenisation, where an organisation resembles other organisations that face the same set of environmental conditions. This process of isomorphic change is driven by three mechanisms labelled as *coercive*, *mimetic* and *normative* isomorphism (DiMaggio and Powell 1991). Coercive isomorphism is concerned with pressures and forces outside an organisations (e.g. government regulations, supplier organisations, etc.) upon which it may be dependent. Mimetic isomorphism is concerned with organisations doing what other organisations are doing (e.g. fads and fashions) in situations where they are uncertain about what to do. For example, the study of Beatty, Shim *et al.* (2001) shows that organisations that are followers in adopting corporate websites place less emphasis on perceived related benefits than early adopters do. Normative isomorphism is concerned with the way members of a certain profession are trained similarly and therefore are influenced in the way they behave and obtain knowledge. However, newer forms of institutionalism recognise that institutions are not always imposed on an organisation by its external environment (DiMaggio and Powell 1991). Frequently, organisations play an active role in constructing and shaping rationalised myths (Carruthers 1995) or organising visions (Swanson and Ramiller 1997), often characterised as buzzwords, thereby having a more active role in legitimatising their actions.

The agency/structure debate is resolved by Giddens into a duality of structure, whereby agents and structures are not two independently given sets of phenomena, but represent a duality whereby structure is drawn on in human actions but, in so doing, social structures are produced and reproduced (Giddens 1979; Walsham 1993). Structure is both enabling and constraining; structural properties of social

systems are both the medium and the outcome of the practices that constitute those systems. Though the process of action is a production of something new, at the same time, all action exists in continuity with the past which supplies the means of its initiation. Simultaneously, through their regular action and interaction human agents are defining patterns of practices that in the recursive actions become standardised organisation practices, which Giddens defines as the 'structural or institutionalised properties'. In other words, interactions and choice are both enabled and restricted by habits, procedures and other embodiments of structure. Interaction and choice have over time created, changed and reinforced these structural arrangements. The resultant is a dynamic environment where people act on the basis of their stocks of knowledge (interpretive scheme), the available resources and opportunities (facility) and acceptable behaviour (norms). However, in addition, their actions are also affected by unacknowledged[13] conditions and by intended and unintended consequences of action of other human and non-human agents. Thus, social action not only reproduces existing social structure but also produces new structure (Walsham 1993).

Giddens' structuration theory has been applied to IS research by Orlikowski (1992), demonstrating the duality of technology. She argues that technology is both a product and a medium of human action. It is at the same time an outcome of human design and implementation, but it also facilitates or limits future human courses. Moreover, institutional properties influence how humans interact with technology, for example, through design standards, professional norms and state-of-the-art materials and knowledge. Likewise, technology strengthens certain institutional properties by reinforcing organisational structures of signification, domination and legitimation. Another application is that of Barley (1986) who describes the introduction of computer tomography (CT) scanners into two different hospitals.

3.4.4 Organisational change as emergent and improvisational versus planned change

Turning to organisational change as a form of organisational behaviour, Giddens notes that "change, or its potentiality, is inherent in all moments of social

[13] Which Giddens describes as unconscious motives operating 'outside' the range of the self-understanding of the agent. (Giddens 1979, p. 59).

reproduction" (Giddens 1979, p. 114). Every change is a social system logically implicates the totality and thus implies structural modification. Weick notes that organisational change is a continuous activity with diverse and varied origins, multiple actors with multiple interpretations and actions which combine to make up the change process (Weick 1993; Daft and Weick 1984). Regarding change more as *improvisation* 'as we go along' than as a planned and intended action, he concludes that control over change is never complete and unintended consequences are commonplace. As a response to these consequences, people revise their sense of what is happening and what can be accomplished. These revised interpretations, rather than initial decisions, guide action and the outcome of change (Weick 1993). Mintzberg and Westley (2001) build on this notion of Weick when they argue managers should include 'seeing first' and 'doing first' approaches to decision-making next to the traditional rational model of 'thinking first'. They argue that decisions and actions can equally be driven by ideas and imagination ('art'), experiments and experience ('craft') as it can by planning or facts ('science'). Ciborra argues for supporting 'smart and competent' improvisation to enable everyday micro-practices in order to improve change outcomes or IT implementations (Ciborra 1999). Rather than looking for more sophisticated techniques or more structured systems, the flexibility and effectiveness of improvisation in 'taking things as they come' (ibid, p. 141) should be appreciated.

Similarly, Orlikowski notes that "change may not always be as planned, inevitable, or discontinuous as we imagine. Rather, it is often realised through the ongoing variations which emerge frequently, even imperceptibly, in the slippages and improvisations of everyday activity. Those variations that are repeated, shared, amplified, and sustained can, over time, produce perceptible and striking organisational changes" (Orlikowski 1996, p. 89). Classifying change, she categorised three types of change: *anticipated*, *emergent*, and *opportunity-based* change. *Anticipated changes* can be seen as changes that are planned ahead of time and occur as intended; *emergent changes* are changes that arise spontaneously out of local innovation and which are not originally anticipated or intended; *opportunity-based changes* are changes that are not anticipated ahead of time but are introduced purposefully and intentionally during the change process in response to an unexpected opportunity, event or breakdown.

These notions of emergent and improvisational change are a radical break with traditional perceptions of change. Traditionally, organisational change is perceived as predictable, controllable and structured, where the change can be guided using blueprint plans. Change in this vision can be engineered. This rational and mechanical (e.g. Morgan's metaphor of the machine) vision of organisational change can still be seen to prevail in Western societies with its roots in widespread management theories, such as classical management theory (with its aim to 'engineer' efficient organisations), management of change and scientific management by Taylor (Morgan 1986). This rational view too is visible in many dominant views on how decision-making in organisations occurs.

Instead, in this thesis we recognise that "change is multifaceted, involving political, cultural, incremental, environmental, and structural, as well as rational dimensions. Power, chance, opportunism and accident are as influential in shaping outcomes as are design, negotiated agreements and master-plans" (Pettigrew 1990, p. 268).

3.4.5 Organisational decision-making

As seen in section 3.2.1, evaluation is closely linked to decision-making. In this section we discuss organisational decision-making. Normative research has engendered an increasing consensus among researchers about the kind of decision-making that should be described as rational (Mares 1991). Typically, rational decision-making is associated with terms such as measurable, calculated, based on logic and hard data, systematic, objective, factual, reasoned, etc. At the same time, empirical research has found ample evidence of decision-making processes that appear 'irrational' by the normative standards (Brunsson 1985). Irrational elements in decision-making are associated with personal preferences, (gut) feelings, subjectivity, politics, intuition, entrepreneurship, ambition, instincts, beliefs, etc. These apparent irrationalities are not limited to minor decisions: people behave similarly when they approach major decisions on strategic issues. It can even be argued that the apparent irrationalities are greatest in the case of the weightiest decisions (Janis 1972). Moreover, Brunsson refers to Lundberg (1961), who observed that investment calculations are made when small marginal investments are considered, but not when major strategic investments are being discussed.

The traditional thinking about decision-making can be classified as rational and normative (Mares 1991). The decision process is seen as a rational process, in which decision-makers know and oversee all possible alternatives and choose a solution that maximises their returns in accordance with their explicit preferences. Moreover, traditional research on decision-making was not just descriptive, but insights from practice have been translated to normative prescriptions on how to best perform decision-making. According to the prescriptions, rationality in decision-making can be threatened by a lack in the areas of information, policy and insight into organisational processes, a lack of consensus, control and management and the improper use of decision-making tools (Koopman 1980).

The traditional model of decision-making has been criticised by many only to be applicable to one decision-maker who only has one goal which can be described in quantitative terms (Harrison 1981). Moreover, it has been criticised for its assumptions that there are a limited number of known solutions, all of which are known to the decision-maker and that the optimal alternative can be 'calculated'. Simon (1960) argues that decision-makers do not look for the optimal but rather the solution that satisfies, and decision-makers only posses *bounded rationality* in that they do not research all alternatives and consequences, but only a few, which allows them to avoid new and uncertain alternatives. Due to *cognitive dissonance*, people close their eyes to information that does not fit into their perceptions of reality. In addition, Lindblom (1959) argues that individuals and organisations have conflicting rather than unified goals. Reaching a compromise with all involved may be the more important issue (Avgerou 1995). Moreover, different stakeholders can attach quite different values to objectives even though the objectives themselves may be shared (Land 2000). It seems that rationality, when defined as denoting "thought and action which are consciously in accord with the rules of logic and empirical knowledge, where objectives are coherent, mutually consistent and achieved by the most appropriate means" (Mitchell 1979, p. 154) has little to do with the process of decision-making in organisations.

Brunsson argues that many rational decision-making perspectives fail to recognise that managers do more than make decisions. Making a decision is merely a step

towards taking action. The decision is not the end product. "Managers get things done – act and induce others to act" (Brunsson 1985, p. 18). He contends that there are two kinds of rationality: *decision rationality* and *action rationality*. The decision rationality is concerned with the function of choice; to choose the right thing to do. The action reality is concerned with the function of action; to get it done. Both rationalities serve different purposes which are difficult to pursue simultaneously because rational decision-making procedures seem irrational from an action perspective (Brunsson 1985, p. 27). If a decision is to initiate intended action, it must incorporate elements of *expectation, motivation* and *commitment. Expectation* refers to the aspect that individuals must find it worth-while to act, which requires them to be able to envisage the result; *motivation* deals with the individual assessment of the action to be taken, and whether the person regards it as good or bad; *commitment* relates to the social aspect of action: people must be able to rely on certain types of behaviour (of the team or organisation).

From a decision-rationality perspective, we are prescribed to:

1. evaluate all possible alternative solutions to a problem – or at least as many as possible;
2. consider all relevant consequences of the alternatives proposed, both positive and negative;
3. evaluate according to a set of predetermined criteria, preferably in the form of objectives;
4. decide for the alternative that comes out most favourably in the preceding analysis.

However, from an action-rationality perspective, effective decision processes break all of the rules of rational decision-making: few alternatives should be analysed, only the positive consequences of the chosen actions should be considered and objectives should not be formulated in advance. Considering multiple alternatives and all (negative) consequences evokes uncertainty, and uncertainty reduces motivation and commitment. If people are uncertain whether or not a proposed action is a good idea, they are less willing to perform it or to commit themselves to promoting its success. Evaluating against predetermined criteria is undesired from an action perspective, because decision-makers are only too likely to formulate inconsistent objectives and

to find it difficult to assess the alternatives. Finally, automatically deciding for one alternative based on a rational analysis may work to make a choice, but when decision-making generates action, the choice is not merely the statement of a preference for one alternative; it is also an expression of a commitment to carry out an action.

Brunsson concludes that if decisions should generate action, then "irrationality" (or action rationality) is functional and should not be replaced by more rational decision procedures. Action cannot be expected to derive automatically from decisions, or choices, or problem-solving activities. Organisational action, understood as the result of coordinated individual actions to act within certain limits, is accomplished by several organisation members in collaboration. "Organisational action is at one and the same time the *raion d'etre* of the organisation. The ability to achieve organisational action is not established now and forever simply because an organisation is created; the active maintenance of the organisation is also vital. In a way, the organisation has to be recreated before each new organisational action is undertaken: organising is an ever-recurring activity of organisations" (Brunsson 1985, p. 7).

Morgan (1986) argues that the notion of rationality is always *interest based* and political; it changes according to the perspective from which it is viewed. The question to ask is: rational to whom? Whose goals are being pursued? What interests are being served? He argues that "organisational goals may be rational for some people's interests, but not for others" (ibid, p. 209). In fact, an organisation embraces many rationalities. Moreover, managers often use the idea of rationality as a resource for pursuing political agendas – "justifying actions that suit their personal aspirations in terms that appear rational from an organisational standpoint" (ibid, p. 209).

On making decisions and in making choices, Elster (1989) discusses two lines of thought in the social science of human behaviour associated with Adam Smith and Emile Durkheim: the difference between *homo economicus* and *homo sociologicus*. The former is supposed to be guided by instrumental rationality, while the latter is dictated by social norms. Elster contends: "Rational action is concerned with outcomes. Rationality says: If you want to achieve Y, do X. By contrast, I define

norms by the feature that they are not *outcome-oriented.* The simplest social norms are of the type: Do X, or: Don't do X. More complex norms say: If you do Y, then do X, or: If others do Y, then do X. More complex norms still might say: Do X if it would be good if everyone did X. Rationality is essentially conditional and future-oriented. Social norms are either unconditional or, if conditional, are not future-oriented. For norms to be *social*, they must be shared by other people and partly sustained by their approval and disapproval. " (Elster 1989, p. 99) He concludes that to accept social norms as a motivational mechanism is not to deny the importance of rational choice. Actions, he argues, typically are influenced both by rationality and by norms. Sometimes the outcome is a compromise between what the norm prescribes and what rationality dictates. Notice that these norms may very well be unacknowledged, tacit or unconscious (Giddens 1979) to the people who employ them (also see section 3.4.3). Giving (rational) accounts for decisions made might therefore become problematic.

Studying the role of intuition in decision-making, Agor (1984) argues that intuition plays an important role in strategically important decisions, where uncertainty is high and little prior experience or information on the effects exist. Based on this, Mares (1991) argues that decisions, for instance, on proposing someone for an appointment rely more heavily on intuition and less on analysis, than for example decisions on the closure of a business unit. He argues further that intuition and analysis go hand in hand, where speculative elements in intuition can be reduced by analyses, and rational analyses can be assessed through experiences, commonsense and intuition. He shows that at some point the dichotomy between analysis and intuition is lost. Quoting a general manager, he argues that "you automatically combine intuition with the analyses you receive or make, since intuition is after all a collection of knowledge, experience and wisdom" (ibid, p. 62) which you cannot detach from in analysis.

In the discussion of the rationality of altruism, Knox (1999) argues that the limited view of *economic rationality* is outcome-oriented, focusing more on the *ends* and efficient ways to reach them, than process-oriented, focusing on the *means*. Whereas economic rationality would qualify altruism as irrational, since a monetary contribution would be more efficient than to volunteer, he argues that rationality only

requires the effectiveness of means to a desired end, not the relative efficiency of the chosen means compared to other possible means. For example, if one chooses to write a paper on a manual typewriter rather than a computer, it would not necessarily be qualified irrational. However, if one would attempt to write a paper on the piano keyboard, rationality would be violated since the means is categorically ineffective to the end. Goals can *justify* action rationally, but they do not govern a particular choice of means that can *explain* action.

In conclusion, the traditional rationality theories seem *insufficient* to understand organisational decision-making. Although one might be inclined after reading all of the above to argue that these theories are completely inappropriate, rather than just insufficient. However, we argue that in many decision-making processes elements (such as data, figures, analyses, etc.) connected to these rational theories *are* often influential in decision-making (Mares 1991). The point we want to stress here is that their influence may be partial, and understanding of the decision-making process should include the effects of politics, norms, intuition, instinct, gut-feeling and the rationality of action (Bannister and Remenyi 1999). Though with such understanding, we can avoid reductionism by heeding a word of caution from Morgan: seeing organisations as political systems, "we begin to see politics everywhere and look for hidden agendas even when there are none. [...] Under the influence of a political mode of understanding, everything becomes political" (Morgan 1986, p. 212). Our understanding of decision-making should be balanced between the 'rationalities' and 'irrationalities' – looking from case to case to see how they each influence the actual decision-making. Or as Batty (1978) contends "intuition and judgement cannot be replaced by the collection of facts, but there is no doubt that the decision-making mechanism is likely to be strengthened materially by the systematic collection and analysis of relevant data" (quoted in Powell 1999).

3.4.6 Conclusion on organisations

In this review on organisations, we briefly discussed different perspectives on understanding organisations, organisational change and decision-making. We touched upon several contemporary theories that shape current ideas about the behaviour of organisations.

The above implies that understanding the employment of IT evaluation methods requires a special focus when we study organisations. In our analysis, special attention should be given to the difference between intended and emergent consequences, and explanations of the differences could be found in a link to structure. We should take into account the duality of agency and structure; in which agency is a continuous flow of conduct governed by intentionality (which is both conscious and unconscious) and conditions unacknowledged by the human agent (operating 'outside' the self-understanding of the agent). That action has intended as well as emergent, unintended consequences. The consequences in turn have effects on structure which constrains and enables new actions. From this perspective, it does not suffice to inquire into people's intentions when adopting a new evaluation concept to compare them to certain outcomes, but instead we should analyse the process of evaluation employment. In addition, the improvisations along the way require much more attention when we aim to understand the employment of IT evaluation concepts fully.

3.5 CONCLUSION

Research in IS has displayed a major focus on managerial and technical approaches to IT, and in particular to IT evaluation. It holds an oversimplified view on IT evaluation on how organisational processes with regard to the employment of IT evaluation methods take place and on the ways in which organisations are defined. This chapter has been devoted to the complexity of all these areas which must be combined in our research. Current understandings of IT evaluation employment are too narrow to provide the understanding required to address our research question and related paradox.

Evaluation is a complex and dynamic social construction. IT evaluation methods are related to highly complex issues such as the value of IT, uncertainty of investments and future results and social processes (inherently political) such as decision-making and organisational change. Understanding the employment of such methods, within complex contexts such as organisations, requires a research approach that is not

limited, but includes ideas related to social, economic, political, cultural and historical perspectives. Such an approach must be able to account for agency/structures, intended/emergent consequences and rationality/irrationality. It should account for both social and technical attributes of the phenomenon of evaluation method employment.

Combining insights from the previous chapter on underlying philosophical paradigms and the explicit ideas on IT evaluation presented in this chapter, we discuss in the next chapter two particular theoretical perspectives that can broaden our understanding of the employment of IT evaluation methods in organisations.

Chapter 4: Diffusion Theory and Actor-Network Theory as a Theoretical Framework for Analysis

4.1 INTRODUCTION

Using insights gained from Chapters 2 and 3, the goal of this chapter is to highlight some explicit theories that can be helpful in understanding the case study of this research. In a way, it is a search to define a language for understanding. The theories discussed here will shape the analysis of the case study and ultimately the conclusions drawn from it. Proper theories provide 'sensitising devices' to develop understanding. "Theory is both a way of seeing and a way of not-seeing" (Walsham 1993, p. 6). In other words, it helps to highlight certain perspectives, but at the same time blinds us to other perspectives. This chapter outlines the theories that dominate in the analysis of the research.

We will start by describing the diffusion theory, which is a dominant theory in understanding the process of diffusion and adoption of innovations. Although analysis with this theory is very common and gives interesting insights, it will be argued that a deeper understanding is gained by using the actor-network theory (ANT). We will demonstrate this in Chapter 6 by first analysing our case study using the diffusion theory, showing the insights such an analysis gives and then point out some interesting questions that it leaves unanswered. We will then turn to ANT to address these questions. To facilitate this analysis, this chapter describes both the diffusion theory and ANT.

4.2 DIFFUSION THEORY

4.2.1 Introduction

Our research question as stated in section 1.2.2 has been derived from the mainstream discourse in the IS literature. It demonstrates the idea that evaluation methods can be regarded as useful tools which lead to beneficial effects in terms of better costs and benefits management of IT. The paradox that has been highlighted is concerned with the question why, given these beneficial effects, these methods are not more widespread among organisations that face questions concerning gaining a

better grip on the economics of IT. Since it is concerned with the spread or adoption[14] of the evaluation methods, the *diffusion theory* is a good candidate for analysing these types of questions. Diffusion is concerned with examining the diffusion and adoption of innovations within and among organisations. Being a logical starting point for analysis, we will discuss this theory further.

4.2.2 Diffusion theory

Probably the broadest research perspective on diffusion and adoption of innovation is Everett Rogers' work 'Diffusion of Innovations' (Rogers 1995). It is the basis of many studies in diffusion and adoption of (technological) innovations. According to Rogers, an innovation is "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (ibid, p.11). Since we are interested in understanding the adoption of a new concept (an IT evaluation method) in an organisation, it seems justified to see how the theory of Rogers can help. Our aim of conducting an analysis using the diffusion / adoption theory (hereafter: diffusion theory) from Rogers is to gain an understanding of the influential elements in the adoption of evaluation methods. In our analysis (Chapter 5), we want to demonstrate which parts of the evaluation adoption the diffusion theory can help explain with respect to the case and which parts it leaves unexplained.

Rogers' theory on the *innovation decision process* states that diffusion is a process through which an individual (or other decision-making unit) passes, that it occurs over time and can be seen as having five distinct stages. The stages in the process are known as: knowledge, persuasion, decision, implementation, and confirmation. Potential adopters must become aware of the IT evaluation concept and obtain the *knowledge* of its existence. Once awareness of it is established, the adopter can at any point enter a *persuasion* stage during which he/she seeks and processes information in order to decide whether to adopt the evaluation method. At several points in time, the adopter may make a *decision* not to adopt, to postpone adoption, to continue the search for information or to adopt the new innovation. This persuasion stage is followed by an *implementation* stage in which the innovation is

[14] We use 'adoption' of evaluation concepts to mean the 'uptake and continuous use' of concepts, rather than 'the decision to use' as proposed by Rogers (1995, p. 21). However, Rogers does not use his definition too strictly, since elsewhere he states that "adoption of an innovation is the process of

put in place. Finally, the adopter re-evaluates or *confirms* his/her decision to adopt the innovation. The result may be either continuance or discontinuance of the evaluation method.

According to Rogers, five particular attributes of an innovation can explain the differences between the adoption or non-adoption of an innovation. These are relative advantage, compatibility, complexity, trialability and observability. *Relative advantage* is the degree to which potential adopters see an advantage for adopting the innovation; *compatibility* is the degree to which the innovation fits in with potential adopters' current practices and values; *complexity* is degree of the innovations ease of use; *trialability* is the degree to which potential adopters have the availability of "testing" before adopting; and *observability* is the degree to which potential adopters are able to see observable results of an innovation.

These characteristics and the way they are perceived by potential adopters, Rogers argues, determine the speed with which an innovation is adopted by potential adopters. This rate of adoption is positively related to perceived relative advantage, compatibility, trialability and observability and is negatively related to the perceived complexity of the innovation. Other factors that determine the rate of adoption are the type of innovation-decision-making (be it optional, collective or authority); the communication channels (e.g. mass media or interpersonal); the nature of the social system (e.g. its norms, degree of network, interconnectedness, etc.); and the extent of the change agents' promotion efforts.

Typical applications of diffusion theory focus on finding adoption-diffusion factors that determine the adoption or non-adoption of a certain type of innovation. These factors can be related to a wide range of aspects of the innovation and its context, such as innovation characteristics, organisational characteristics, characteristics of the environment and characteristics of the communication channels. Typically these factors are researched through variance research, whereby hypotheses about influential factors in adoption-diffusion are statistically tested through (multiple) case research. Variance theory-building is concerned with identifying causal links

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using an existing idea" (ibid, p. 174, original italics). Thus our meaning attributed to the term 'adoption' seems compatible with his understanding.

between variables that conform to the view that the precursor (X) is a necessary and sufficient condition for the outcome (Y). Variance models thus explain the variability of a dependent variable based on its correlation with one or more independent variables (Shaw and Jarvenpaa 1997). The next section shows examples of the results obtained by using diffusion theory in IS research.

4.2.3 Diffusion theory in information technology research

Diffusion theory is used by many studies in IT research. Prescott and Conger (1995) identified 70 IT articles published in IT outlets between 1984 and 1994 that relied on this theory. It has been used widely to research the factors promoting or hampering the adoption of IT. An extended overview of examples of studies of diffusion theory in information systems is presented in the table in the Appendix of this thesis (from Fitchman 1992 adapted by Lefebvre and Lefebvre 1996).

Each empirical study sheds light on a particular set of adoption factors in some specific contextual environment. Diffusion theorists have put effort in presenting exhaustive lists of factors influencing IT adoption and testing in case studies which of these factors are generally influential.

To illustrate here, we present the study of Lefebvre and Lefebvre (1996) who identify a range of internal and external factors that may affect the adoption of technologies by examining a large number of diffusion studies. Factors internal to the firm that may affect the adoption of technologies include (Lefebvre and Lefebvre 1996): the firm's past experience with technology (operationalised by variables such as time since first acquisition, number of technologies or applications adopted, types of technologies or applications adopted, current level of assimilation and integration of technologies and percentage by class of personnel familiar with the technologies); the firm's specific characteristics (with variables such as availability of financial resources, centralisation, formalisation, technocratisation and size) and the firm's pursued strategy (with variables such as strategic orientation, technological policy, technological awareness and technological scanning). External factors are conditions that exist in a firm's external environment and may affect its technology-adoption decisions (Lefebvre and Lefebvre 1996). These factors include the industry level, the macroeconomic environment and the national policies.

Diffusion theory has been widely applied but also widely criticised. The next section describes the major criticisms on diffusion theory.

4.2.4 Critiques on and limitations of diffusion theory

Diffusion theory can be critiqued for different reasons. Organisational diffusion studies typically consider independent variables (e.g. based on elements of the innovation, the organisation and environment or context) as determining the outcome of the adoption process. In knowing the variables, they claim that suppliers or users of innovations can determine the outcome of an innovation adoption or even influence outcomes by manipulating variables in a way that is more favourable (e.g. Frambach and Schillewaert 2002). Typically, diffusion theory has a normative character. It prescribes factors which should be attended to in order to ensure a more successful adoption and diffusion ('critical success factors').

Ontologically, diffusion theory, in particular the early applications based on variance research, can be seen to be aligned with the conventional paradigm. The failures of variance approaches to generate understanding undermined their positivist assumption that a theory of innovation would "gradually emerge from the accumulation of more and more data" (Downs and Mohr 1979, p. 380). This constitutes its major weakness. Although the diffusion theory in reducing the world to a number of factors becomes applicable in practice, it looses out on richness in its simplification of the phenomenon under study. It has been argued that social reality cannot be reduced to a small set of discrete variables (such as values, beliefs, stories, norms and rituals) that can be documented and manipulated in an instrumental way (Morgan 1986). Innovation does not have to have distinct and measurable features, but complex systems have 'interpretive flexibility', having different significance depending on context and time (Lyytinen and Damsgaard 2001). Moreover, diffusion research has been critiqued to produce endless lists of factors which are "inconclusive, inconsistent and characterised by low levels of explanation" (Wolfe 1994, p. 405). An explanatory theory based on research aimed at finding such factors has been elusive because "virtually every determinant employed has proved to be a highly and inexplicably erratic predictor of innovativeness with an impact that varies dramatically across studies" (ibid., p. 405). The influence of factors can be shown to

be very dependent on the time, history, situation and context in which they are applied. Institutional arrangements, context and technologic and economic constraints reshape the diffusion space in which the innovation is diffused (Lyytinen and Damsgaard 2001). Though this is acknowledged by some diffusion theorists contending that "knowledge of the extent to which variables affect different stages in the adoption process differently is still limited" (Frambach and Schillewaert 2002), they still continue to hold on to diffusion theory to discover such factors through progressive research. The critique is strengthened by the acknowledgement that the formulation of these 'factors' is historically situated, socially constructed and corresponds to time-dependent managerial ideas and movements used in specific contexts for complex reasons (Mitev forthcoming; Lyytinen and Damsgaard 2001).

An illustration of the limitations of diffusion theory has been shown in the case of business process re-engineering (BPR) (Newell, Swan *et al.* 2000). With BPR, adoption theory would predict a slow diffusion process due to certain characteristics of BPR, such as the fact that it is complex, incompatible with current practise, not easily observable and alters organisational practise. However, practise shows a rapid and widespread use of BPR (with various levels of utilisation and success) in communities of firms and academics (Newell, Swan *et al.* 2000). Newell, Swan *et al.* argue that the weakness of the diffusion theory by Rogers can be explained if it is recognised that the defining characteristics of new technologies are not, as assumed by traditional models, given and permanent, but rather are perceived and therefore influenced by cognitive, social and political processes. The attributes of the complex technologies are not fixed and rigid but socially constructed.

Thus it is contended that research based on diffusion theory has produced few consistent findings regarding the causes, consequences or management of the innovation and adoption process (Wolfe 1994). The ability to make the kinds of generalisations and predictions that are typically associated with science and models is consistently being undermined by the phenomenon of complexity (Edwards 2000).

Another major critique is the unitary view of diffusion theory. Rogers (1995), for example, sees an organisation as "a stable system of individuals who work together to achieve goals through a hierarchy of ranks and a division of labour" (ibid, p. 375).

Such functionalistic assumptions normally view politics in organisations as disruptive. In its social-technical approach, it sees technology as having inherent qualities that 'naturally' drive its diffusion, and social factors merely as interfering. Managers are thus portrayed with neutral tasks, neglecting the inherent, formal, hierarchical power differential that exists within organisations (Hislop, Newell *et al.* 2000, p. 400). However, evidence of conflict and power struggles has become impossible to deny, and the view that technology has a central determining force on an organisation and its socio-political life has to be questioned (Knights and Murray 1994, p. 4). The rate of diffusion is not solely a function of push.

Despite its acknowledged limitations, diffusion theory is still an important influence in IT research. Both in its more traditional form, but also in more progressed forms that address some of the critiques identified in this section. These are discussed in the next section.

4.2.5 Progressions in understanding diffusion of innovations

Building on the foundations of diffusion theory, many researchers have through the years extended the notions of diffusion in order to better understand the phenomena related to the diffusion of innovations.

The traditional diffusion theory has been criticised for its lack of consideration regarding the (attributes of the) innovation itself (Rogers 1983; Rogers 1995), and in response, these attributes were then given consideration. Moreover, rather than variance research, process research was advocated to aid in understanding the nature of the innovation-decision process.

Traditional diffusion research has been based on variance research, discerning general properties of adopters to which the innovation is introduced. Its purpose was to investigate the variables related to innovativeness in a generalised way across different innovations. However, variance research does not show any order of events neither does it provide insight into the process of innovation. It merely investigates the "variables related to innovativeness" (Rogers 1995, p. 188). Process research, by contrast, seeks to study the conceptual stages of the innovation-decision process and determine the time-ordered sequence of a set of events to explain the causes and

effects. It attempts to explain the occurrence of an outcome by identifying the sequence of events preceding it (Shaw and Jarvenpaa 1997). In addition to variance research, Rogers therefore promotes a process research to explore the nature of the decision process involved in the adoption of the innovation and explain the causes and sequences of related events over time.

As was argued in the previous section, variance research fits in the category of positivistic research. Process research, though still connected to variance research to find influential factors or characteristics, is more open to understand *why* in a certain context specific characteristics seem to influence events in a particular way. Although the characteristics of this process are still often reduced to a limited number of generalised 'variables', the analysis is much more descriptive and qualitative and does not rest on statistical generalisation (Shaw and Jarvenpaa 1997, p. 188). Moreover, it acknowledges to a greater extent probabilistic and random influences which may cause cause-and-effect paths to deviate from the expected route (Shaw and Jarvenpaa 1997). In its analysis, it is more contextually conscious and may even be supported by interpretive assumptions. Still, diffusion research was focused on finding generalised variables (or particular events) which could determine the rate of a particular (fixed) technology. The limitations of this "technology-push" approach have been recognised (Baskerville and Pries-Heje 2001). This type of research has also been criticised for its simplistic linear cause-and-effect explanations which neglects the interplay between them (e.g. Pettigrew 1990). Research shows (including this research) that stages overlap, are iterated, surpassed and frequently change order (Newell, Swan *et al.* 2000).

More sophisticated insights were gained when a move was made to look beyond perspectives on technology with fixed and permanent attributes. Additional notions such as 'perceived characteristics' and 'reinvention' (Rogers 1995) made diffusion theory more sensitive to interpretivistic notions that the adoption of technology was not deterministically technologically driven but much more of a social phenomenon. Characteristics of innovations were no longer considered inherent attributes of the technology, but were influenced by the perceptions of potential adopters (Davis 1989). Notions of universally applicable best-practice solutions gradually came to a fall and were seen to be flawed. Traditional diffusion theory had underestimated the

role of the adopters in appropriating the innovation. In its simplest form a linear "market-need" approach to innovation can be distinguished, but interactive models for combining technology-push and market-need approaches have also been proposed (Baskerville and Pries-Heje 2001). However, it can be concluded that more sophisticated diffusion studies typically view the adoption process as a process that involves (human) action in the form of a (rational) decision either to adopt or reject the innovation. Adoption is seen as the *decision* to make full use of an innovation (Rogers 1983). Many researchers have convincingly shown that organisational changes due to newly introduced concepts in organisations often are emergent and unanticipated. The adoption of these concepts is neither intended nor deliberate (e.g. Orlikowski 1996).

Another extension to diffusion theory has been the focus on the communication channels and networks by which (potential) adopters learn about innovations. Early insights talk about the diffusion networks in which opinion leaders influence the opinions of others and in which the interconnectedness between individuals in a communication network plays an important role in the spread of innovations (Rogers 1995). Later insights develop the notion that adopters are not part of one social network, but a variety of social networks through which ideas are communicated. Individuals that are 'boundary spanning', that is both active in penetrating interorganisational networks as well as connected within the networks within their own firm, drive forward new ideas and innovations (Tushman and Scanlan 1981). Communication through both oral and written language, as well as formal codification (e.g. through numerical representation or representation in information systems) can be argued to influence diffusion. Hasselbladth and Kallinikos (2000) theorise that three characteristics of innovations with respect to their codification impact their spread across different contexts and their institutionalisation: namely the ease with which they can be reproduced (e.g. an algorithm is more easily reproducible than a painting), the extent to which they are perishable or durable (e.g. writing is more durable than speech) and the degree to which they are immediately comprehensible and communicable (e.g. how well they are expressed in terms that reflect established significations and meanings). They argue that management models with low or modest codification, such as BPR and TQM are relatively easily communicable, but more perishable and not easily reproducible, which may account

for the fact that such models become fashionable, diffuse quickly across various organisational contexts, but also fade and change relatively rapidly. By contrast, models supported by formal codification have a more stable meaning, since such codification they argue creates barriers to alternative interpretations which in turn contributes to durability.

However, communication about innovations is not comprehensive and politically neutral, but inherently limited and politically shaped. Particular aspects of the innovation can be communicated selectively according to the interests of the communicators (or change agents). Notably, the way IT suppliers, vendors and consultants selectively communicate about new IT innovations has been highlighted as being influential in the adoption of innovations, even enticing adopters to adopt technologies that were not appropriate for them (Newell, Swan *et al.* 2000). Expanding the micro-organisational view of previous diffusion theories, Newell, Swan *et al.* (1998) call for an analysis of meso-industry and macro-national level contextual factors that influence the adoption of innovations. Such an analysis can show how innovations spread, regardless of their technical merits. In a similar fashion, Edwards (2000) argues that the accomplishment of innovative action depends on the dynamic contingencies of the institutional setting.

Building on these insights, Newell, Swan *et al.* (2000) present a knowledge-focused perspective, arguing that one should not focus on the spread of particular technological artefacts related to the innovation (e.g. technological concepts such as BPR, JIT, CRM, ERP, and the like), but rather on the spread of ideas and knowledge underpinning a technology. The solutions that present themselves as generic 'best practices' actually need to be 'unpacked' and reconfigured to fit the firm-specific context. The innovation processes are presented as a 'knowledge integration problem': the difficulty of unbundling and integrating commodified knowledge with firm-specific knowledge. They argue that understanding the innovation diffusion can be extended by exploring the processes of knowledge bundling and unbundling and reintegration. The knowledge-focused perspective is used by Beynon-Davies and Williams (2003) to provide an interpretation of the low take-up of information system development methods and the considerable adaptation of these methods in the cases where they were adopted. From their initial analysis, they argue that these

methods are packed bundles of knowledge, which are then unpacked with various levels of success in different organisations.

Further understanding of diffusion comes from social constructivists who demonstrate the influential role of actors beyond the suppliers or targeted adopters involved in the innovation. For example, in the promotion of computerisation, there is a large contribution from all kinds of actors, including colleagues, trade associations in the computer industry, professional societies, regulatory agencies and the media (Iacono and Kling 1996). Pinch and Bijker (1987) tell the story of the development of the bicycle. Conflicts between different social groups related to the bicycle can be seen to shape the bicycle innovations. The innovation is shaped by technical conflicts (regarding requirements to meet speed versus safety), conflicting solutions to meet requirements (different bicycle designs) and moral conflicts (women wearing skirts on bicycles). Social groups, which share the same set of meaning attached to the specific artefact, present various solutions for dealing with these conflicts and problems. In the interaction of the social groups, the innovation is constructed and the diffusion is propelled. Some have termed this approach to diffusion 'emergent', since the innovation can be seen to be influenced by unpredictable and inevitable setbacks and surprises, arising out of the organisational and social context (Baskerville and Pries-Heje 2001). In contrast to traditional theories of diffusion, building on a general notion of consensus, politics, conflicts and competition have entered the contemporary understanding of innovation diffusion.

The understanding of diffusion of innovations can be seen to have progressed a long these lines. In this thesis, when we analyse our case using diffusion theory, we use the diffusion theory as promoted by Rogers (1995), which is more socially informed and has a more qualitative nature than diffusion theory that stems from variance research. This approach can be labelled socio-technical (see section 2.2.5).

4.2.6 Conclusion on diffusion theory

Though we have not come across academic publications studying the topic of IT evaluation method diffusion, the elements identified originating from different studies (including ones that apply or were informed by diffusion theory) in section 3.3.4 can be seen to influence the diffusion of such methods. If we were to employ a strict version of diffusion theory, we would start by defining some hypotheses about such elements or factors that are likely to influence the adoption of evaluation methods. A variance research in diffusion-adoption theory would argue that from a statistical analysis the most important factors could be uncovered and measured on a measurement scale of some sort.

Though we do not aim to determine statistically which factors are in general the most influential, as a variance approach to diffusion theory would dictate, all of these elements (and more) can influence the employment of an evaluation method within any context. However, only by closer analysis are we able to discover which elements are influential in a particular context, and why in that particular case, they are in fact influential.

By saying that studies based on diffusion theory have such limitations, it is not our conclusion that they are not helpful in understanding the adoption of evaluation concepts. The factors identified by these and others studies can be very helpful in understanding our case. In fact, many identified factors will indeed be very influential in a large number of cases. However, we do not subscribe to the ideas that a generic framework can be used to understand the complexity of the case, or that it can predict or be used to control the outcome of the adoption. Neither will we try to validate adoption models or identified adoption factors with the intention of constructing such a generic framework. Instead, the factors will be used as complementary to the more socially acknowledgeable theories, and their sole function is to analyse the case study in this research.

Diffusion theory offers a widely used approach to explore the adoption process of innovations, and given its compatibility with our research question it is discussed in this work. Although it seems like the natural starting point for our analysis, we know that this theory cannot definitively conclude the analysis considering all the various

ways in which it has been subjected to criticism. The theory will be applied to the case in a minimalistic way to demonstrate where the interesting questions lie.

To move beyond a functionalist understanding of evaluation adoption, we propose using the actor-network theory for gaining a deeper understanding. In this theory, technological innovation is viewed as an attempt to build and stabilise a diffuse system of allies composed of human and non-human entities (Mitev forthcoming, p. 8). It enables one to circumvent technological determinism in which technical projects and innovations proceed naturally unless they are actively stopped, and replaces it with the idea that *things do not happen unless human and non-human actors make them happen.*

In the next section we will explore the actor-network theory in more detail.

4.3 ACTOR-NETWORK THEORY

4.3.1 Introduction

Although the diffusion theory, given its focus on understanding diffusion of innovations, offers a natural starting point for addressing our research question, we explore here the actor-network theory (ANT) as a possible addition to help with a further understanding of the case. One of the main motivations for including actor-network in our analysis is the fact that it may offer additional insights with regard to the dynamics of the employment of evaluation methods in organisations. Diffusion theory, including its enhancements, has a strong tendency to make a distinction between the technology (the innovation) and the social. In this instance, bringing the two theories together is the actual diffusion.

However, we argue that IT evaluation has both technical and social merits at the same time (see the ideas presented in Chapter 3), and that therefore it might be appropriate to try to overcome the distinction between technical and social for a better understanding. We argue that it is neither the inherent *properties* of the innovation nor some properties of the (social) context (including potential adopters and other actors) that drives the innovation, but rather the *associations* that exist and are created between the innovation and its surrounding actors. Actors that are both

technical and social. ANT presents a view of *translation,* which in focusing on associations rather than properties, is radically different from the ideas proposed by the diffusion theory.

In this section we will describe ANT so that we can use it in our analysis of our case study. We will highlight some of its uses in IS research and finally discuss its critiques.

4.3.2 Actor-network theory

Actor-network theory employs a particular vocabulary, which though in terms may appear in other theories (for example, systems theory), however have in ANT a quite different meaning. The particular interpretation ANT gives to notions such as 'network', 'black-box' and 'translation' will therefore be discussed in this section. We will briefly outline the actor-network theory by means of addressing a number of questions:

- What is ANT?
- What is ANT about? What is the essence of ANT?
- What is an actor?
- What is a network and what an actor-network?
- What is a translation?

For a more comprehensive explanation of ANT, please refer to the publications referred to in this section.

What is ANT?

In short, actor-network theory, or the 'sociology of translations' (Callon 1986a), is concerned with studying the construction and transformation of the heterogeneous networks (Law 1992) that are made up of people, organisations, agents, machines and many other objects; studying the networks that constitute the world, existing of both humans and non-humans. It explores the ways that the networks of relations are composed, how they emerge and come into being, how they are constructed and maintained, how they compete with other networks and how they are made more durable over time (Tatnall and Gilding 1999). ANT examines how actors enlist other actors into their world and how they bestow qualities, desires, visions and motivations on these actors (Latour 1996a).

What is ANT about? What is the essence of ANT?

The essence of actor-network theory is a perspective of the world that shows it to comprise heterogeneous networks that form actors. All phenomena are the effect or the product of heterogeneous networks (Law 1992). Even persons are made up out of a heterogeneous network, as Law describes (1992):

"However, I will press the argument in another way by saying that, analytically, what counts as a person is an effect generated by a network of heterogeneous, interacting, materials. This is much the same argument as the one that I have already made about both scientific knowledge and the social world as a whole. But converted into a claim about humans it says that people are who they are because they are a patterned network of heterogeneous materials. If you took away my computer, my colleagues, my office, my books, my desk, my telephone I wouldn't be a sociologist writing papers, delivering lectures, and producing 'knowledge'. I'd be something quite other - and the same is true for all of us. So the analytical question is this. Is an agent an agent primarily because he or she inhabits a body that carries knowledge, skills, values, and all the rest? Or is an agent an agent because he or she inhabits a set of elements (including, of course, a body) that stretches out into the network of materials, somatic and otherwise, that surrounds each body?"

To understand phenomena (such as acts, events and actors) these networks, these actors, need to be studied without imposing on them *a priori* definitions or expectations; to avoid *a priori* distinctions between the technical and the social. Or, put in another way, actor-network theory argues avoiding both technological determinism and social reductionism (Monteiro 2000). ANT does not accept any form of reductionism (neither technological nor social) that splits up the technical from the social and supposes that the one drives the other. It states that there is no reason to assume, *a priori*, that either objects or people in general determine the character of social change or stability (Law 1992). As such, ANT supports analytically treating objects and people the same; non-humans and humans together form the heterogeneous networks.

We illustrate this thinking with an example. Think about how ordinary life is influenced by a wide range of factors, including social and technical, but also

political and historical factors. For example, when driving a car we are influenced by traffic regulations, previous driving experience, and the car's manoeuvrability (Monteiro 2000). To understand the phenomenon of driving a car, we should consider all these influencing factors together. In ANT, the actor-network that makes up this event should be analysed. The actor-network is those elements in a context that shape action.

To address the need to treat both human and non-human actors fairly and in the same way, ANT is based upon three methodological principles (Callon 1986a): generalised agnosticism, generalised symmetry and free association. In *general agnosticism,* the researcher abstains from censoring or judging the actors, whether they are human or non-human. In *generalised symmetry*, researchers are required to use a single repertoire when human and non-human, social or natural elements are described. The rule is not to change registers when moving from the technical to the social aspects of the problem studied, or to give either of them special explanatory status. In *free association,* the researcher must abandon all previous distinctions between natural and social events. There can be no boundary between the two; they might be separated later, only as the result of analysis and understood as outcomes or effects, but cannot be divided *a priori*, assuming it is the given order of things (Law 1999).

What is an actor?

Actors are those elements in a context that shape action while pursuing their interests. An actor is something that acts or to which activity is granted by others. It implies no special motivation of human individual actors or of humans in general. An actor can literally be anything provided it is granted to be the source of an action (Latour 1996b).

But as Law argues, actors are also "an effect generated by a network of heterogeneous, interacting, materials" (Law 1992). He demonstrates (see above) as an example that for a researcher to be a researcher, he has to be aligned with surrounding actors such as books, a computer, an office, colleagues, etc. Social agents are never located in bodies alone, but rather are patterned networks of heterogeneous relations. By punctualisation or black-boxing, actor-networks themselves "make up an actor". Thus each actor is made up out of actors and at the

same time is part of an actor. Or, in the vocabulary of actor-network, each actor is itself a (simplified) actor-network and is at the same time part of other actor-networks. As Latour (1999a) argues, actor and network designate two faces of the same phenomenon – the social phenomenon called actor-network; that is "a certain type of circulation that travels endlessly without ever encountering either the micro-level or the macro-level". Law states that all attributes we normally associate with human beings, such as thinking, acting, writing, loving and earning, are generated in networks that exist beyond the body. An actor is also always a network (Law 1992).

Since actors are actor-networks in infinity, the researcher must choose how the network under research is 'zoomed in and out' and which actors are included. "It entails that that the 'actor' of an analysis is of the 'size' that the researcher chooses as most convenient relative to the direction of the analysis" (Monteiro 2000, p. 82). However, being seen as an actor and thereby producing a simplification of complexity, either by researchers but *more importantly by other actors*, shows "the result of a mobilization process with black-boxing effects. The ordering these simplifications produce is neither neutral nor 'obvious'. They are *made* obvious or natural in order to achieve an effect – namely, to curb opposition or alternatives" (ibid, p. 82). Thus, we see that in choosing the size or shape of an actor the researcher is not completely free, but bound by other actors' practice – what is obvious and natural to them. Thus, actors should have some *obviousness* and *naturalness* to them.

What is a network and what is an actor-network?

By being aligned with each other, actors form an actor-network. This alignment is achieved through the *translation* of interests and the *enrolment* of actors into the network. Translating involves showing how an actor's non-aligned interests may become aligned. Alignment is established in *inscriptions* that give a particular precedence in terms of a viewpoint. Inscriptions refer to the way technical artefacts embody patterns of use (Monteiro 2000), or how certain viewpoints, values, opinions and rhetoric are converted into devices or materials (such as reports, documents and scientific papers - Callon 1986b), or frozen into codes or computer applications (Bowker and Star 1994). Latour uses the term 'immutable mobile' to describe such network elements that when they are moved around in time and space, they remain

stable and unchanged (Tatnall and Gilding 1999; Latour 1999b). For example, a car can be considered an immutable mobile when it displays a relational pattern of certain properties (such as infrastructure, oil industry, driving-licences, traffic signs, garages, etc.). Such a network can move through time and space without changing these properties. It displays properties of *irreversibility* (Walsham 1997).

To Law (1992) the core of the actor-network approach is "a concern with how actors and organisations mobilise, juxtapose and hold together the bits and pieces out of which they are composed; how they are sometimes able to prevent those bits and pieces from following their own inclinations and making off; and how they manage, as a result, to conceal for a time the process of translation itself and so turn a network from a heterogeneous set of bits and pieces each with its own inclinations, into something that passes as a punctualised actor." In this sentence, he talks about 'for a time' because once a network is formed, it is not formed once and for all. It can always become unstable since new actors, the desertion of existing actors or changes in alliances can cause the *'black-boxes'* (Callon 1986b) of networked actors to be opened and their contents reconsidered. A black-box is "a way of talking of the simplified points that are linked together in an actor-network" (Callon 1986b), which is also a network in its own right. Law (1992) speaks of a 'punctualised actor'. Latour (1987, p. 108-121; Hepso 2001) describes five alternative strategies for enrolling others in the punctualisation or creation of a black-box: to appeal to the other's explicit interests ("I want what you want"); to get the others to follow our interests ("You want what I want"); to suggest a short detour ("I will take care of your interests, if you follow me"); to reshuffle interests and goals by tactics such as inventing new goals and inventing new groups ("We all want this"); by becoming indispensable to the others ("You need me to get what you want").

A network recursively generates and reproduces itself and relies on the active maintenance of its simplifications or 'punctulisation' for its continued existence. Network, contrary to other uses of the term, does not imply some fixed thing, but a dynamic, actively shifting alliance of actors. A network becomes durable partly due to a structure where each point is at the intersection of two networks: "one that it simplifies and another that simplifies it" (Callon 1987, p. 97).

What is a translation?

Just as an actor is hard to scope, so is translation. It is a term used in many different ways. Literally the term translation denotes two meanings, both relevant to ANT. In the first place, it is a change of position and a (new) interpretation. Latour (1991) describes "[t]he innovation is translated or carried from one position to another in the sense of a mathematical manipulation; the innovation is also interpreted or transposed from one position to another in the linguistic sense of the word translation. Translation operates between actors: an actor gives definition to another actor, imputes him/her/it/them with interests, projects, desires, strategies, reflexes, afterthoughts." And secondly, according to Callon (1986b), a translation is "the methods by which an actor enrols others. These methods involve: (a) the definition of roles, their distribution, and the delineation of a scenario; (b) the strategies in which a [future state actor-network] renders itself indispensable to others by creating a geography of obligatory passage points; and (c) the displacement imposed upon others as they are forced to follow the itinerary that has been imposed" (ibid, p. xvii). In the process of translation, Callon discerns four 'moments': problematisation, interessement, enrolment and mobilisation. During *problematisation* one actor makes an effort to make other actors subscribe to its own conceptions by demonstrating that they have the right solutions to, or definitions of, others' problems. During problematisation the actor tries to demonstrate their quality of being indispensable to the solution of the problem (McMaster, Vidgen *et al.* 1997). The problem is re-defined (translated) in terms of solutions offered by this actor (Bloomfield and Best 1992), who then attempts to establish themselves as an 'obligatory passage point' which must be negotiated as part of its solution. To pass through the obligatory passage point, the other actors must accept a set of specific conventions, rules, assumptions and ways of operating laid down by the first actor (Tatnall 2000). During *interessement* an attempt is made to impose the identities and roles defined in the problematisation on the other actors, thereby locking other actors in the roles proposed for them. Gradually existing networks are thus replaced by the new network (Grint and Woolgar 1997). *Enrolment* occurs when a stable network of alliances is formed and the actors yield to their defined roles and definitions (Singleton and Michael 1993). Finally, during *mobilisation* the proposed solution gains wider acceptance – it has become taken-for-granted and is black-boxed.

Moreover, translation can be seen as to "re-interpret, represent, or appropriate others' interests to one's own. In other words, with a translation one and the same interest or anticipation may be presented in different ways, thereby mobilizing broader support." Translation is necessary for stability in the network, since actors from the outset have a diverse set of interests (Monteiro 2000). Aligning these interests causes a network to become stable and durable. In fact, translation can be seen to create new relationships between actors to form an actor-network: '[t]ranslation is a process in which sets of relations [...] are proposed and brought into being' (Callon and Law 1989). The goal of translation can be seen as to bring together complex entities into a single object or idea that can be mobilised and circulated like a branded commodity or a taken-for-granted fact (Clarke 2001).

As Monteiro (2000) describes it: "In ANT terms, [information system] design is translation: users' and others' interests may, according to typical ideal models, be translated into specific 'needs'; the specific needs are further translated into more general and unified needs, so that these needs can be translated into one and the same solution. When the solution (system) is running, it will be adopted by the users who translated the system into the context of their specific work tasks and situations" (ibid, p. 77).

4.3.3 ANT in information systems research

ANT has been employed in many different cases to investigate the successes and failures of technological innovations. Some notable examples are mentioned here.

Callon (1986a) has used it to explain the failure of the domestication of the scallops of St Brieuc Bay and the development of the electric vehicle by the Electricité de France (Callon 1986b). Latour has used actor-network theory to analyse the development of a revolutionary public transportation system known as Aramis (Latour 1996a) and to discuss the achievements of Louis Pasteur (Latour 1999b). Monteiro and Hanseth (1995) studied the role of standards in EDI systems and information infrastructure (Hanseth and Braa 1999). Vidgen and McMaster (1996) have applied it to the adoption of a particular car-parking system.

Silva and Backhouse (1997) used the concepts of ANT to explain the failure to institutionalise the London Ambulance Service information system. Mitev (2000) has employed ANT to study the problematic introduction of an American computerised reservation system and yield management at French railways. Wagner (2003) draws on ANT to study the design and implementation of an ERP system in an academic environment.

More and more studies apply ANT in IS research. Overall, ANT is beginning to gain firm ground within IS research.

4.3.4 Critiques on and limitations of ANT

ANT has been criticised from different stances. Walsham (1997) criticises ANT and its disregard for social structures, its lack of political analysis and its poor capacity for explanations. Furthermore, the role of the researcher as actor in the research has been criticised (Clarke 2001), which relates to the dependence between results from an ANT study and the viewpoint presented by the researcher. Also, the discussion between humans and non-humans, and which explanatory power is given to each, is a subject debate. Finally, ANT is criticised for its underestimation of 'exogenous contingencies'. These critiques are discussed below.

Social structures

ANT has been criticised for neglecting macro social structures and focusing only on local contingencies. How can the local and the global be related? However, ANT argues that macro levels can be investigated with the same methodological tools as the micro-level – "the macro-structure of society is made of the same stuff as the micro-structure" (Latour 1991, p. 118). ANT allows movement between levels of analysis; it actually denies a difference between macro structures and micro interactions – differences between network and actor; they "are two faces of the same phenomenon" (Latour 1999a, p. 19). Walsham (1997) suggests drawing upon the structuration theory by Giddens (1984), which links levels of analysis from the individual to the global and offers models of social action and structure at multiple levels to overcome this problem. However, Latour (1999a, p. 17, original italics) argues "maybe the social possesses the bizarre property of not being made of agency and structure at all, but rather of being a *circulating* entity." In other words, the

social is circulating between actor and network. Moreover, ANT argues for keeping the same framework of analysis for tackling both a "macro-actor or a micro-actor" (Callon and Latour 1981) and for making the notion of an actor-network scalable: one element of an actor-network may be expanded into a new complete actor network, and vice versa, a whole actor-network may be collapsed into one element of another actor-network (Monteiro 2000). Impacts on the micro or respectively the macro level can thereby be analysed to show its effect on either of these levels.

Political analysis

Walsham (1997) criticises the amoral stance of ANT and thus its lack of insight concerning political viewpoints. He argues that additional political and ethical theories might be needed to understand case findings. For example, the reason for the African continent almost totally being excluded in the Internet cannot be understood by simply investigating the network. He suggests that the empirical results from an ANT study should also be debated in terms of the moral and political issues. Furthermore Mitev (forthcoming) argues that treating the actors as equal is problematic: not all actors are equal; some exert a stronger influence than others.

In a similar way, Knights and Murray (1994) criticise ANT for the way in which it gives little or no attention to the broader powers and inequalities that are both the condition and consequence of network formations. Latour replies by a counter critique to critical theorists who rely too much on inequalities of the social: "Critical theorists argue that through the medium of artefacts, domination and exclusion hide themselves under the guise of natural and objective forces. Critical theory thus deploys a tautology – social relations are nothing but social relations – to which it adds a conspiracy theory: society is hiding behind the fetish of techniques. But techniques are not fetishes, they are unpredictable, not means but mediators, means and ends at the same time. [...] Critical theory is unable to explain why artefacts enter the stream of our relations, why we so incessantly recruit and socialize non-humans. It is not to mirror, congeal, crystallize, or hide social relations, but to remake these very relations through fresh and unexpected sources of action. Society is not stable enough to inscribe itself in anything. On the contrary, most of the features of what we mean by social order – scale, asymmetry, durability, power, hierarchy, and the distribution of roles – are impossible even to define without recruiting non-humans.

Yes, *society is constructed, but not socially constructed.* Humans, for millions of years, have extended their social relations to others actants with which, with whom, they have swapped many properties, and with which, with whom, they form collectives" (Latour 1999b, p. 197, original italics).

In other words, it is true that there are inequalities, but not *a priori*, dividing the social and technological. ANT does not accept any reductionism; neither machines nor human relations are determinate in the last instance. It is argued that there is no reason to assume, *a priori*, that either objects or people in general determine the character of social change or stability. Indeed, in particular cases, social relations may shape machines, or machine relations shape their social counterparts. But this is an empirical question and usually matters are more complex (Law 1992). The social and the technical might be considered separate when understood as effects or outcomes, but not as given in the order of things (Law 1999). Both (through inscriptions) can have an impact in the resulting inequalities between actors. The same conclusion as before can be drawn: "Moral and political issues should be debated from a solid empirical base, and actor-network theory offers a contribution to the latter if not directly to the former" (Walsham 1997, p. 475).

Poor capacity for explanations

ANT is argued to be much more a method for describing rather than explaining. However, Latour (1999a) argues that ANT never was intended to be "a theory of the social or even worse an explanation of what makes society exert pressure on actors [but a] very crude method to learn from the actors without imposing on them an *a priori* definition of their world-building capacities. [...] ANT does not claim to explain the actor's behaviours and reasons, but only to find the procedures which render actors able to negotiate their ways through one another's world-building activity" (ibid, p. 20). In other words, it never was intended to explain the behaviour of social actors, but in a much more ethnographic sense a way for researchers to study what, how and why actors behave the way they do – not claiming to explain this behaviour by all kinds of exterior forces unknown to the actors themselves. 'Explanation' in this sense, and as it will be used in the analysis part of this thesis, is intended to describe in detail the events and actions that take place and how they interact, rather than to find (invisible) causes (e.g. contextual explanations) or linking

perceived events to generalised social theories (e.g. explaining that actors acted the way they did because that is consistent with a particular social theory).

Role of the researcher

Another point of critique on ANT is the position of the researcher. From the idea of generalised symmetry both humans and non-humans are considered *a priori* equal. However, the role of the researcher in labelling actors, defining passage points, scoping the actor-network, telling the story and so on is very influential in the results an ANT study delivers. The researcher enters the study with his/her own theoretical backgrounds, ideas and preconceptions (Clarke 2001). A way to deal with this critique is to adopt a more reflexive approach towards the researcher within the study. Moreover, Monteiro (2000, p. 76) argues that "employing ANT still requires a researcher to make critical judgements about how to delineate the context of study from the backdrop", that is: the researcher should be critical in their labelling of actors and in their analysis in general, thereby being guided by the actors themselves. "Abbreviations, short-circuits and simplifications are always *produced.* [...] The ordering these simplifications produce is neither neutral nor 'obvious'" (ibid, p. 82).

Humans versus non-humans

ANT is debated by many for its notion of symmetry between human and non-human actors. The main critique is that people have been reduced to the same level as things and machines. However, human qualities such as emotions, which play a vital role in human activity, seem to be lost (Mutch 2002). Moreover, with the notion of inscriptions, technology seems to have been granted some deterministic property. But ANT does not claim humans and machines are the same – it merely states that one should first attempt to discover the influential elements that actually determine action, be it technical or non-technical (Monteiro 2000). For example, to discover the influential factors that influence the way we drive our car, we need to know the engine's capacity (technical) as well as the driver's training (non-technical). Rather than distinguishing technical and non-technical *a priori*, ANT argues that they might have more in common than not.

To perceive the term inscription as being an action that is inscribed and hard-wired into an artefact is a misconception (Monteiro 2000). It merely is used to describe

how concrete anticipations and restrictions of patterns of use are involved in the development and use of a technology. It is neither the case that the object determines its use, nor that an object is infinitely flexible in its interpretation and appropriation by its user; it is an interplay between both extremes.

Exogenous contingencies

The critiques on the ANT discussion above can be summarised as a warning that ANT might be too 'flattening'. By perceiving actors equally, important social constructions and discourses may be lost. Only relying on the configuration of actor-networks is not enough for explaining why and how some actors are more empowered (Mitev forthcoming) while others are disempowered; and why and how there may be pre-existing conflicts between actors which shape outcomes. Using ANT, the role of 'exogenous contingencies' such as economic crisis, deregulation and IT-supported managerial principles may be underestimated. Mitev (forthcoming) argues that conceptualisations, for example, of the market, economics, organisations, management or culture should be explored further. It is not sufficient to understand that actors hold particular beliefs or interests, but rather an analysis is needed to understand how and why this actor has taken these beliefs for granted – how they have shaped the actor's interests. And moreover, how this grants particular actors the status of being more empowered than others.

4.3.5 Conclusion on ANT

ANT provides an approach to analyse our case study that is promising. It offers us a language of analysis that sensitises us to new ways of understanding. The dichotomy between the social and the technical (see section 2.2.5) is solved by the perception that both are intertwined. Moreover, ANT does not reduce *a priori* IT evaluation employment to simplistic factors, but it is able to analyse it in all its complexity. It cuts across economical, strategic, social and technical issues related to IT evaluation and allows for making sense of the unfolding employment process (Monteiro 2000). Though not having a history comparable to that of the diffusion theory, ANT has demonstrated its usefulness in IS research.

4.4 COMPARING DIFFUSION THEORY AND ANT

We have discussed two theories to help us understand the employment of evaluation methods in organisations. In this section we will zoom in on the differences between the two.

The main difference between the two is in the social-technical stance (McMaster, Vidgen *et al.* 1997). In diffusion theory, the social system and technology are regarded as separate. In the perspective of technical innovations, the diffusion of innovation is the adoption of technology by a social system. In ANT, the social system and technology are considered inseparable. Apparent separation between the two in case of a certain technological concept successfully being employed by an organisation is merely the evidence that the actor-network has stabilised; the technology has been black-boxed and therefore appears to be separate. The employment of an innovation thus can be regarded a technology "yet to be black-boxed", whereas diffusion theory would consider it to be a technology which attributes have to be demonstrated to the (potential) adopters. Once the innovation has been pointed out to the adopters, then it should just be a matter of time before everyone, except the most immovable, recognise its advantages (McMaster, Vidgen *et al.* 1997).

In diffusion theory the innovation is transferred and adopted in its original form, or at most, it is reinvented in its implementation, whereas in ANT the innovation is *translated* in its enrolment. The innovation is dynamically transformed in appearance and meaning. Reacting to diffusion theory, Latour states that "... after many recruitments, displacements and transformations, the project, having become real, then manifests, perhaps, the characteristics of perfection, profitability, beauty, and efficiency that the diffusion model located in the starting point." (Latour 1996a, p. 119). In other words, whereas the diffusion theory argues that the inherent qualities of the technology and the characteristics of the adopters determine the outcome of the diffusion, ANT argues that only through its translation does the technology gain such qualities in its associations within the heterogeneous network. The innovation has no technological deterministic path of adoption, but by contrast moves only if it interests one group of actors or another (Tatnall 2000) who may perpetuate it further,

transforming it along the way. Technological innovation thus is viewed as an attempt to build and stabilise a diffuse system of allies composed of human and non-human entities (Mitev forthcoming).

Furthermore, the diffusion of the technology in diffusion theory relies upon shared human interests and beliefs (McMaster, Vidgen *et al.* 1997) which accounts for its spread, whereas ANT is based on differences in interests. The spread of the innovation hereby is based on a translation where interests between actors are aligned after which the innovation becomes black-boxed.

One final major distinction between the two is the difference between concerns. Diffusion theory has a strong tendency to make links between cause and effect (McMaster, Vidgen *et al.* 1997) and search for causal factors that explain why some technology transfers are successful and others fail. The concern of diffusion theory then is to predict and even influence the potential for success or failure of future innovations. By contrast, the ANT approach is concerned with a deeper understanding of the phenomenon at hand. It strives to study how actor-networks (people and things) are created, strengthened and weakened. It does so by offering concepts and a language that describe the translations in "all their glorious messiness and irrationality, rather than in sanitized accounts created after the fact" (McMaster, Vidgen *et al.* 1997).

4.5 CONCLUSION

In this chapter we have discussed diffusion theory and actor-network theory as two starting points from which to analyse the case studies. Diffusion theory was chosen because it is a widely accepted theory of the diffusion of innovations and for its compatibility with the research question. However, after having considered the limitations of diffusion theory, the actor-network theory was added to the case analysis.

In this research we will start with a brief analysis based on Roger's adoption theory to show where this theory can be helpful in understanding the employment of evaluation methods and where it leaves questions unanswered. ANT will be used to

analyse even further the same case and investigate how problematic explanations from diffusion theory can be understood differently. Both analyses will help to give a better understanding of the adoption process of IT evaluation methods.

Chapter 5: The Employment of an IT Evaluation Method at an Insurance Company

5.1 INTRODUCTION

This chapter is devoted to describing the case study and covers the design, introduction and employment of an IT evaluation method (ITEM) at IIC, one of the largest insurance companies in the Netherlands. The case spans the period from 1996 until 2001.

IT is frequently considered to be at the heart of the insurance industry. In theory, this industry only sells 'pieces of paper and promises' (Knights and Murray 1994, p. 55). In practice, however, sales, underwriting, renewal and claims procedures all require the collection, manipulation, storage, retrieval and updating of considerable amounts of data. In addition, insurance companies are required to save their data for extended periods of time, usually decades, and a considerable part of the industry's profits is closely linked to stocks and shares investments. Therefore, employing a system that is able to handle large amounts of data as well as compute the complex calculations necessary to gauge insurance risks and stock investments makes IT vital to the industry.

Financially speaking, IT can be considered of paramount importance to the financial sector. This sector, including banks, insurers and pension funds, has the largest IT costs in the Netherlands. In 1999, this sector spent € 3.7 billion on IT (CBS 1999), almost 30% of the total € 12.4 billion spent annually on IT in the Netherlands. Even though banks are accountable for the majority of this spending due to the numerous transactions that require intensive data communication and security, the insurance industry and the pension funds did however manage to account for € 1.7 billion in spending in 1999. Moreover, due to 'all finanz' concepts[15] (see section 5.2.3), insurance and banking are continually becoming more and more integrated. Typical IT costs are hardware, software packages, customised software, externally hired IT

[15] The 'all finanz' concept denotes in financial jargon the integration of types of financial products (such as insurance and banking products).

personnel and a company's own IT personnel. Included in these are both maintenance and new IT investments.

We start this chapter by describing the external context of the case and then move on to discuss common technologies and related changes in the insurance industry at the time depicted in the case description. Furthermore, we offer some insight into the relevancy of IT and IT evaluation for the insurance industry. We will then specifically discuss the context, history and culture of IIC, all three of which play a role in influencing the way IT is managed. The core of this chapter is devoted to discussing the case of IIC employing ITEM. The case will be analysed in the following chapter.

5.2 ENVIRONMENT AND TECHNOLOGY IN THE INSURANCE INDUSTRY

5.2.1 Introduction

To understand the environment of the case study, we detail here some major trends, technological and otherwise, in the insurance industry during the period of the case study. We consider here important changes such as regulations, competitive behaviour and mergers, market demands, Y2K problems, the introduction of the euro and general globalisation.

Subsequently, we discuss the changes in the environment of insurance, including the change of organisational strategies and the role of IT in the financial sector (based on Irsel, Nijland *et al.* 2000). Furthermore, we discuss the topic of IT evaluation in the insurance industry.

5.2.2 Changes in the environment of insurance

The environment of insurance at the beginning of the '90s can be characterised by high profits. Rising profits were very much linked to Dutch prosperity (Barendregt and Langenhuyzen 1995; Irsel, Nijland *et al.* 2000) that had been increasing from the '60s onward and which had driven the demand for insurance products (e.g. products related to financial security and planning). The deregulation that had taken place in the '90s opened up new markets and allowed for the introduction of new financial

products (combining banking and insurance services), which in turn generated new sources of profit. Moreover, the returns on (stock) investments, linked to fluctuations in interest on capital and the overall economic growth, were high and were the driving force behind profits in the insurance industry.

In the '90s, market trends that had originated in the '50s were still gaining momentum. These trends included the blurring of boundaries between banks and insurers[16], the increased use of other market channels (such a bank offices, direct writing and intermediaries[17]), mergers between insurers (and banks) and a tendency toward international expansion (Barendregt and Langenhuyzen 1995; Irsel, Nijland *et al.* 2000). The general trends in financial organisations included globalisation, mergers and strategic alliances with clients who demanded a global and full range of services.

Particular trends of the mid '90s in the Dutch insurance industry included the introduction of the euro currency by the European Monetary Union, the privatisation of Dutch social legislation, changes in the Dutch tax system and the rise and boom of a new distribution channel: the Internet. European integration had not only increased the number of international transactions in the financial industry, but with the coming of a new currency, financial organisations were faced with substantial changes in their products. For example, all the insurance policies had to be converted from the former Dutch guilder to the new euro. Moreover, a common currency would increase price transparency and facilitate cross-border price comparison of insurance products, thereby unleashing a further wave of competitive pressure (Mogg 1998). By a withdrawal from the Dutch government and the privatisation of social legislation, new opportunities arose for insurers, for example, offering products for pension plans and additional health insurance products. Another governmental influence was the change of the Dutch tax law in 2001 which effected insurance

[16] In the beginning of the '90s, banks and insurers enjoyed liberalisation under the European legislation. From then on, the legislated boundaries that restricted competition between banks and insurers were made obsolete.

[17] Financial institutions typically have three distribution channels by which they offer their products and services to their clients (Irsel, Nijland *et al.* 2000): (1) offices (e.g. bank offices or 'insurance shops'), in which the client can have personal contact with the institution; (2) direct writing, which means the client is approached by lines of communications such as mail and telephone; (3) intermediaries, who can be both independent insurance advisers or agents employed by the institution, and who form an intermediary between the institution and the client.

products. The Dutch tax system prior to 2001 allowed for a large number of deductions by which taxpayers could reduce their tax assessments. Insurance companies helped by providing the consumer with policies which offer fiscal advantages: "Pay a tax free premium now and, once retired, receive the benefits at a lower rate of tax". The new tax law of 1 January 2001 was intended to make the tax system more transparent and simple. A result was a reduction in tax-deductible items which effected, among other things, annuity insurances and mortgage provisions. In the preamble to this tax change, insurers had to take measures to comply with the law, but also devise new kinds of products compatible with the new law that were attractive to their clients.

The Internet presented new opportunities to distribute products more efficiently and also to create new products. By the end of the '90s, the Internet was booming: it had invaded the lives of individuals and therefore had the potential to reach large numbers of clients. Moreover, a great many organisations, in particular in the financial industry, saw themselves compelled by environmental pressures (i.e. isomorphic forces, see section 3.4.3) to make use of the Internet; it seemed a necessity for survival. Internet entailed opportunities like transaction cost reductions, but also threats like increased competition from new (international) competitors. Both opportunities and threats drove the need to consider the Internet as a new distribution channel. Characteristic to this development was the number of insurers and banks that outlined their own 'e-business strategy'.

A last trend to be considered is the individualisation and discerning attitude of private clients. Being accustomed to having a broad selection of products and services, individual clients become increasingly critical in the products they purchase and the quality they expect from them. The resulting demand is that products be adaptable for individual considerations.

All these trends have direct and indirect effects on the way insurance organisations are operating and behaving. Moreover, they exert their effects on the technologies insurers are using, managing and on which they are making their decisions.

5.2.3 Changing organisational strategies

Organisational strategies for insurers typical to the '90s were shaped by the developments sketched in the section above. Some of these major organisational strategies included a trend to devise clear combinations of products and markets; to introduce consequence management; to add services to products; to reduce time-to-market; to adopt an 'all finanz' approach; to have a strategy for Internet and e-business; and to reduce costs (Irsel, Nijland *et al.* 2000). These are discussed below.

The increased competition and higher demands from clients leads to a strategy that develops specific products for specific markets. Whereas the focus of insurers used to be on products (e.g. life, health and property products), it has now shifted so that the products become more focused on the fulfilling the wishes of specific groups of clients (markets). By making a very distinct product / market combination, insurers can devote their attention and efforts and thus hope to beat their competition. Creating such products also entails organising the organisational work processes in such a manner that the products and services are optimally supported for specific targeted markets. On the other hand, in order to meet client demand fully, the insurer also needs to cover a broad range of possible products.

Consequence management concerns the continuous measurement of differences between results and objectives and taking actions accordingly. This entails the measurement of the return on products, market groups, distribution channels, but also the quality of organisational processes and employees. Improvement and measurement programs, such as Total Quality Management and the Business Balanced Scorecard, are common concepts in these times.

To discern oneself from one's competitors, insurers increasingly try to develop new products or improve the quality of their existing products. One of the ways this is attempted is by adding supporting services and improved quality to products. Examples of this are to have international coverage for products, increase the speed of payments and provide a high quality help-desk.

Having a short time-to-market for new products is vital to insurance companies. Products are often quite easy to copy and the market tends to be saturated quickly.

To develop new products and be able to deploy them quickly is one way of staying ahead of the competition. Insurers therefore follow strategies that allow them to create, deploy and innovate new products flexibly; they aim to reduce the time-to-market.

With the joining of banking and insurance activities, an 'all finanz' approach has been adopted by many insurers. This entails the use of shared distribution channels (e.g. use bank offices to sell insurance products) or the creation of new products by integrating bank and insurance products into new ones (e.g. combing insurance products with investment products). The operations of the organisations are arranged accordingly.

Many insurers, given the rise of the Internet and other distribution channels, have increasingly adopted a multi-channel approach to support their clients. The client is supported (in the so called front-office function) by a range of channels, such as phone, intermediary, the Internet and offices. Thus, the client enjoys the flexibility of being able to operate from any place he or she chooses and at any time that is convenient for them. This approach however forces organisations to integrate all these channels together in the back-office organisation that produces the products. The problems related to this are often referred to as front-office / back-office integration.

Finally, increasing competition, decreasing profit margins and decreasing return on investments have led many insurers to adopt a cost reduction strategy. Such a strategy has an impact on the complete organisation since it affects all of the different business units.

These developments and strategies are not unique to the Dutch insurance industry. Knights and Murray (1994) describe similar conditions in the insurance industry in the UK during the described period. The range of strategies adopted has its implications for the use of IT.

5.2.4 Insurance sector and IT applications

This section highlights some of the most important developments in IT applications within the insurance sector (based on Irsel, Nijland *et al.* 2000). We focus on developments in applications rather than in technology (such as Internet, software development languages – Java, workflow management, virtual reality, multi-media, mobile telephony, etc.), since it is in their application that these technologies become meaningful to the insurance sector.

Since the mid-twentieth century the use of computers in insurance was considered of major importance –so important that it was and still is a major issue for merger and cooperation considerations (e.g. Adriaanse 1994; Barendregt and Langenhuyzen 1995). IT already went hand in hand with very high costs. The application of IT was then to assist in the central administration of huge amounts of data. This contributed substantially to the efficiency of data processing. Computers were only used centrally, not in the office work place. It was not until the '70s that microcomputers were introduced locally and in the years to follow, desk terminals were introduced. These then were followed by personal computers.

Focusing on the '90s, typical trends in IT applications for the insurance industry were related to the development of the Internet. Internet technology has been used in building websites for information purposes (e.g. virtual marketing and offering brochures), private client transaction handling (e.g. selling products on-line) and business transactions (e.g. communication and transactions via extranets). In that time, illustrative to the interest of the financial industry with regard to the Internet was the interest that insurers and banks took in Internet Service Providers[18]. The aim was to create profiles of clients at an early stage and offer them customised products. By offering a portal to the Internet, the insurers tried to commit the client to their organisation.

Another on-going technological challenge is that of the legacy systems. Typically, information systems in insurance organisations have their origins in years past. Systems that were developed during the'70s are still operational as a result of

[18] Examples include: Postbank with provider Freeler and Achmea with provider NOKNOK.

enhancements, additions and partial renewal. But through the years, the systems have grown in complexity. Reasons for this include the growing number of customers, the increasing number of products and policies and increases in links to other information systems. Throughout the years, requests and demands from external parties (such as government and powerful customers) have led to numerous adjustments and changes in the systems. In addition, due to the long life span of insurance products, systems are not easily renewed. Products sold decades ago still last for decades (e.g. in life insurance products). Moreover, due to the large number of mergers in the past, all kinds of different technological systems had to be converted or linked to existing systems. As a result, contemporary insurance companies bear the complex legacy systems that are vital to their operations but very difficult and expensive to change. In the '90s, a clear trend was visible in that insurance companies attempted to make an effort to renew their legacy systems.

Other technological trends are related to call centres being used for the distribution and improvement of the quality of support, the use of new expert systems for risk management (e.g. to support insurance advisors and intermediaries, to support acceptance procedures for insurances, to assess damages when claims are made and to check for possible fraud), systems for Customer Relationship Management (CRM), the design of flexible information systems (e.g. to remove the old legacy systems) and Electronic Data Interchange (e.g. communication between insurance company and intermediary). Moreover, there is always the issue of updating IT in the workplaces and local networks which is crucial to the overall operations of the organisation.

Like all IT-applying organisations in Europe, the insurance industry saw itself faced with two major IT developments at the end of the last millennium, specifically the Y2K-problem and the conversion to the euro currency. Both developments had major impacts on the IT budgets and available IT capacity. These projects had a tremendous impact on organisations in the financial sector which typically had built large and complex information systems. In fact, in those times it dominated the work processes of the entire organisation: every organisational member in some way or another was busy with one of these projects.

The developments sketched above led to a yearly increase in IT budgets throughout the 1990's. Moreover, it can be seen that many of the developments described above additionally increased IT costs in the '90s without directly improving benefits (Spangenberg, Peters *et al.* 1999). One reason for this was the shortage of IT resources at that time. At the end of the millennium, there was a high demand for IT professionals, but the supply was limited. Moreover, salaries of IT employees were higher and rose faster than other category of employees. Also, a large turnover in staff led to losses in productivity which needed to be compensated by increasing investments in training. The training costs also increased due to the newness of the technology which in turn brought with it a high initial cost. Finally, a large part of IT projects (e.g. euro, millennium and legacy substitution projects) had no or little return on investment. These projects were considered inescapable and vital to the organisation even though they did not produce direct benefits other than avoiding future problems.

5.2.5 Insurance sector and IT evaluation

During the period discussed in the case study, IT evaluation (e.g. Parker, Benson *et al.* 1988; Oirsouw, Spaanderman *et al.* 2001), cost control of IT projects (e.g. Acohen and Florijn 1992), the productivity paradox (e.g. Strassmann 1985), IT Balanced Scorecard (Kaplan and Norton 1996) and IT benefit management (e.g. Irsel and Swinkels 1992) are lime-lighted topics in Dutch management and IT-related literature. Also, financial literature addresses these topics. For example, Campbell (1992) observed that too many financial institutions blindly invest in the latest technology, hoping that it would improve efficiency and control costs. Consultancy organisations that are influential in the financial sector increased awareness on this topic (e.g. GartnerGroup 2000). Together with the practical experience that IT projects frequently last much longer and cost much more than initially planned (Genuchten, Heemstra *et al.* 1991), and even have the reputation to be partial or completely wasteful due to failures (Siskens, Heemstra *et al.* 1989; Berghout 2002), these different sources raised the awareness of IT evaluation in general, and specifically in the financial sector with its high and increasing IT costs.

However, research demonstrates that overall the financial sector only sporadically employs formal IT evaluation methods or methods for IT cost control. For example,

Nijland (2000) concludes from a study of the financial sector in the Netherlands that *ex ante* evaluations hardly display the use of formal evaluation methods and *ex post* evaluations are almost never carried out. Stansfield, Berghout *et al.* (2000) reach a similar conclusion about the Scottish financial industry. From a study of the Dutch financial industry (Maanen 2000b), it can be concluded that none of the organisations studied applied one of the IT cost models found in the literature. Research from Serafeimidis (1997) shows a case study at a UK insurance firm that did not consider IT evaluation methods until the early '90s, and then only when they became aware of the information economics method described by Parker, Benson *et al.* (1988). However, the employment of such a method only achieved limited success (Serafeimidis 1997).

5.2.6 Conclusion on the dynamics in the insurance industry

In this section we looked at the dynamics in the organisational and technical environment of the insurance industry at the time of our case study. The developments described have led to an increased importance of IT and the management of its costs and benefits. In the next section we will focus on the case study organisation.

5.3 IIC AND ITS CONTEXT

5.3.1 Introduction

Before we present our case study, we will describe the specifics of IIC. The history and context of IIC and its mission, structure and culture are presented. Furthermore, we focus on IT developments and the way IT is managed at IIC. These insights help to understand the case study better.

5.3.2 History and context

IIC employs approximately 5,000 people in the Netherlands. It is an all-round insurance company which uses intermediaries (agents) as its main distribution channel. IIC is market leader in the Dutch intermediary insurance market. Financially, the total premium income over 2000 rose 11% to € 5.8 billion. Although its main distribution channel is personal, independent intermediaries (at this moment IIC is doing business with about 8,000 intermediaries), IIC also uses other

distribution channels like the Internet, employee benefits (EB), bank offices and captive intermediaries (dedicated IIC intermediaries). Its insurance products can be divided into three parts: private insurance, employee benefits and business insurance. *Private insurance* concerns all life, property and health insurances for privates. *Employee benefits* covers all insurances concerned with the relationship between employer and employee, such as collective health insurances, pension insurances, disablement insurances and other loss of income insurances. *Business insurance* covers the insurances specifically for the business, such as insurances for company cars, technical insurances and all kinds of liability insurances.

IIC is a member of the Financial Group United (FGU), a group of financial organisations, consisting of a variety of banks and insurers. FGU has grown into an organisation that operates throughout the world and offers a broad range of financial products and services. It offers integrated financial services to individuals, businesses and institutional clients through a large spectrum of distribution channels aimed at meeting their individual needs. According to capital investment, revenue, and net profit, FGU is one of the largest companies in Holland. FGU also plays a major role in the European market and holds a leading position among worldwide companies offering integrated financial services combining banking, insurance and asset management. In terms of shareholder equity, FGU ranks first in the Netherlands and third internationally among finance groups. In the world's top 50 banks, by the market capitalisation, FGU ranks fourth as of December 1999. Today the company employs almost ninety thousand people in over sixty countries throughout the world, offering insurance in North and South America, Europe, Asia, Australia and New Zealand. Its market value at the beginning of 2000 stands at over € 59 billion.

Founded in the nineteenth century, IIC has a long history of insurance and has undergone several major mergers. It has grown to be one of the most influential companies as it helped to shape the insurance field in the Netherlands. It can be considered a commercially healthy company since throughout it existence it has experienced almost a continuous growth in profits. IIC has representative offices in 29 countries in the insurance industry. In most countries, the products it offers encompass nearly all types of life insurance, property insurance and reinsurance.

5.3.3 Mission, structure and culture of IIC

IIC's mission is formulated as: "IIC helps its clients as leading, integrated financial service company to realise their ambitions in an innovative way. It does this by offering solution-focused financial concepts and excelling in an excellent quality of service." Furthermore, its vision is formulated as: "For IIC, as innovative and high-quality integrated financial service company the client is the starting point. We have contact with the client through the intermediary channel of his/her choice. Clients favour us, due to our reliability, expertise and the quality of our service." This vision places the client at the centre of attention. IIC's choice for a multi-channel strategy allows clients to choose from different channels to contact IIC. However, the primary strategy of IIC is not to sell directly to its customers, but to do so via intermediary channels.

Since 1998, IIC has made a change from a product-oriented focus (e.g. life, health and property products) to a market-oriented focus (e.g. dividing the Netherlands into eight regions and shifting the focus to privates, employers and businesses). This shift entailed a major reorganisation and integration of different departments. No longer did the similarities in products determine how the business was organised, but rather the similarities in market approach and division did. Since then IIC has been a matrix-structured organisation, meaning that it is structured around eight geographical regions (e.g. all encompassing a part of the Netherlands) and has one business unit for national accounts (one overall unit for the large company clients and larger intermediaries who operate across the Netherlands) and three market groups: private insurance, employee benefits and business insurance. See Figure 5.1 for a simplified organisational structure of IIC.

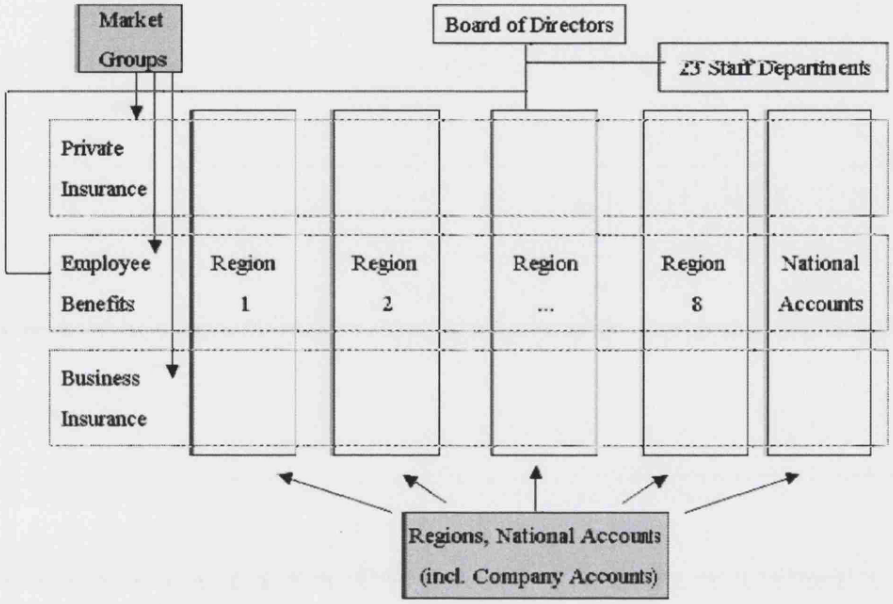

Figure 5.1 Simplified organisational structure of IIC

At the top of the hierarchy is the board of directors which has eight members. Each member is appointed several responsibilities; specifically all market groups, regions and staff departments are appointed to a member of the board. The board of directors will subsequently be referred to as either top or general management.

Organisational management, besides the board of directors, comes both from the *market groups* (the horizontal axis in the matrix) and from the *regions* (the vertical axis in the matrix). All of these business units have their own business unit director. The market groups can be seen to have a more strategic responsibility, whereas the regions have a more operational responsibility.

The *market groups* issue policies and strategies for the regions and national accounts. They also determine product developments, market developments and innovations. They are responsible for the success of promotion campaigns (e.g. marketing), innovations in products (e.g. insurance technicalities) and the speed at which products are introduced to markets. *Market groups* are also are responsible for the proper functioning of the insurance information systems as well as the insurance operational processes.

The *regions and national accounts* are the operational business units that are in contact with the intermediaries and give them direct support. *Regions* are responsible within their region for inside services (such as acceptation, insurance claims, administration, collections of accounts, calculations, portfolio management and tenders), outside services (such as sales, advertisements and support of intermediaries) and commercial programs. In having regional offices around the Netherlands, they support the intermediaries with, among other things, forms and brochures, financial and juridical support and advice about purchase and sale of portfolios.

Besides the support offered by the regions, the intermediaries are also supported by a technical field organisation (to assess damages technically and advise on damage prevention), intermediary staff (to give intermediaries advice on operational and commercial management), insurance software support (to give advice on the development and use of different types of insurance software) and the IIC extranet (with the latest news on insurance policies, product changes, legislation, etc.).

Both the market groups and the regions are supported by 23 different staff departments, such as Financial Services, Human Resource Management (HRM), Legal Support, Communications, Software Development, IT and Program Management. Each staff department is led by a staff head or staff director.

In its personnel management IIC is very faithful to its employees. It offers many educational programs to support employees in their evolvement. It is not unusual for employees to work at IIC for their entire career. Moreover, directors and members of the board generally come from within IIC rather than being brought in from outside. The effect is that top management is very much aware of the 'on-floor' insurance processes, products and clients, since they have had their own experiences with them. One downside of IIC's faithful attitude to its personnel is that some employees are kept on even though they might not perform too well.

Decision-making in the board of directors can be characterised as fraternal decision-making and collective board responsibility. Decisions are discussed and made

together rather than have one CEO decide the direction of IIC. Overall, IIC has a culture of making decisions through a negotiated consensus rather than the top-down imposition of decisions.

Since IIC does not have direct links to its insurance customers, it is vitally dependent on its intermediaries for its business. Likewise, many intermediaries are dependent on IIC, which is one of their largest sources of insurances. These different interests sometimes lead to conflict. One example is the efforts of IIC to adopt an e-commerce strategy at the end of the '90s with the potential to be able to sell products directly to its clients. These developments were observed by the intermediaries with suspicion. But overall the relationship between IIC and its intermediaries can be seen to rest on the mutual dependence on each other.

5.3.4 History of IT at IIC

The history of IT at IIC dates back to the early use of computers in organisations. During the '50s, wages increased and with it the organisational costs of personnel. Moreover, there was a tight labour market. To address the rising costs and the shortage of personnel, IIC found a solution in automation. A computer set was acquired to perform (salary) administrative tasks and carry out complex calculations. It was used in a reorganisation at that time to increase profits of one of the loss-making business units of IIC. The computer, by making use of vacuum tubes and punched cards, could "within 130 hours perform the work of a couple of man-years". In the early '60s, a new set of computer systems was bought to support the accounting function and the printing of policies. Computer purchases, especially of this magnitude (about € 0.5 million), were very extraordinary in those times; the city mayor was invited to put it officially to use. In the years following, IIC too was one of the first to purchase new computer models and other technologies (e.g. being one of the first to use integrated circuits rather than transistors and magnetic tapes instead of punched cards).

IT also played an important role in discussions about mergers with other insurance companies. One insurance company was considered for merger during the '60s

especially due to its possession of a computer company and its knowledge of automation.

In 1975, the first minicomputers were introduced at IIC which were placed throughout the organisation rather than in a central processing unit. They helped to do work on the work floor that until then done was done by hand. Then in 1983 the first personal computers found their way in. The computers increased labour productivity and the speed by which mutations could be processed. Moreover, difficult business processes that were due to the complex insurance product that until then were processed by different people could then be integrated and one person could fulfil all necessary activities required to handle a policy.

By today, IT has expanded outside the offices of IIC. IT now is considered not only very important to the business of IIC, as is for all insurers, but also to connect to the intermediaries. IT supports the communications with the intermediaries. Using EDI and extranets, information is exchanged. Furthermore, all the technological trends discussed in section 5.2.4 and section 5.2.5 can be seen to play a part in the considerations of investing further in IT. For example, IIC faces technological legacy problems with primary systems that date back as far as the '70s.

5.3.5 Organisation of IT management at IIC

Information systems are divided across the three market groups. Each group has its own distinct systems[19] that support (parts of) organisational processes and products from that group. All in all, an estimate of over 400 information systems (both large and small) can be discerned at IIC.

IT management is organised both within these market groups and in the staff departments. Each of the three market groups has an organisational section, a department denoted by System Process Support (SPS), responsible for functional management of the information systems. These SPS sections are responsible for the optimal functioning of existing systems and configuring them (e.g. to changes in

policies). New systems or technical changes to systems are to be requested by them and addressed to the IT staff departments. In addition, as of 1999, each market group is assisted by an information manager who supports the business unit director in linking IT opportunities and threats to the specific business developments.

IT management in the staff departments is divided into two groups: the departments of Program Management and Information Technology. The department of Program Management (PM) is responsible for advising the board of members on the spending and prioritisation of project budgets[20]. Every year budgets (both financially as in labour capacity) are specified to build new systems or improve existing ones. PM advises on the spending of these budgets. Moreover, it monitors running projects and reports on their progress. Finally, it is responsible for comparing project results with prior expectations.

The department of Information Technology, employing approximately 400 people, is in turn split up in two departments. First of all, there is the department of System Development (SD) that is responsible for the development and technical changes of information systems. It assumes the role of software supplier, creating systems according to the wishes of its customers, the market groups or staff departments. Secondly, there is the department of Infrastructure which is responsible for the IT infrastructure and hardware at IIC. These include the hardware systems, local area networks, automated workplaces (e.g. computers and printers) and connections to the Internet and Intranet.

Budgets of IT are allocated centrally to the IT department. This budget is allocated to the different departments in the organisation on the basis of 'system development hours'. The time of SD is divided on the basis of the time requirement estimates in IT project proposals coming from the business departments. General management decides on the actual division based on a prioritisation of project proposals.

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[19] The boundaries between the systems are considered by IIC to be a problem since information on one client can be divided between different systems. Moreover, the same information can differ from system to system.

[20] Though formally responsible for all projects, not only IT, in practice the majority of large projects involve IT and therefore are considered to be IT projects.

Apart from the shift in focus from product-focused to market-focused, as described in the previous section, in 1998 an organisational structure was set up especially for information management with so called *information domains*. Based originally on the value chain[21] (Porter 1985) of the insurance company, different areas of information in the chain were appointed to information domains. In such, different domains for information policies and applications have been identified. These domains include a distribution channel, client, product and supporting services. Each domain has one owner (typically a director from a market group, region or national accounts) who is responsible for the alignment between IT and business in that domain. He or she formulates the business information demands for that domain and is responsible for accommodating the domain with appropriate IT applications. The idea behind the division in domains is that it divides the complex information management within IIC to (more or less) separate, independent areas which are relatively independent of the organisational structure. Even if the organisational structure in the future changes, these domains continue to be relevant since they are based on the lasting value chain. Having separate areas of information management offers domain owners the opportunity to focus their attention on new IT developments that might be interesting to their domains. For example, studies on CRM innovations are carried out by domain owners in *channel services* and not so much by domains in *product services*.

However, though the matrix organisation and the division in domains were introduced in 1998, it becomes evident in the case description that it has not institutionalised much. As one respondent tells:

"We come from a hierarchical organisation with a product focus, but changed to a client-focused matrix organisation. However, the old (product-focused) organisation has partly remained. The governance model of the matrix organisation has not been explicitly adopted. What you now see is people that can choose their own paths to come to decisions (either by markets or by regions), wherever they see room. That complicates decision-making. To come to a better use of the ITEM-documents [see later for explanation] we should have a clearer view on how decision-making takes

[21] The value chain is a common concept for depicting the primary activities (Inbound Logistics, Operations, Outbound Logistics, Marketing and Sales, Service) and support activities (Procurement of Resources, Technology Development, Human Resource Management, Firm infrastructure) of an organisation to create value.

place within the matrix organisation." Moreover, the division in information domains at the time of the interviews was 'still mostly fictional', as was attested by several respondents.

Business policies on the IIC intranet show that from 2000 onwards better control of IT costs and improved IT evaluation are the goals:
"IT plays an increasingly crucial role in our operational management [...] and investments in IT keep on rising. It becomes more and more important to keep a good eye on the return on investment of these IT investments and to control on-going IT costs. [...] To improve the decision-making and the priority-setting process of IT investments takes up an important position. [...] Every investment in IT should be financially supported. [...] Without a costs and benefits analysis IT, investments will not be approved. " (IIC intranet, June 2001).

5.3.6 Conclusion on IIC

Being one of the biggest insurance companies in the Netherlands, all of the business and technological trends identified in section 5.2 can be seen to have their impact on IIC. Already from the early start of their existence, computers were applied within IIC. Reasons for this automation included cost reductions and a tight labour market. Moreover, IT was applied to turn around loss-making business units. Thus, IIC already has a long history of investing in IT, even with strategic purposes and with great expenses. The introduction of decentralised systems has had a major impact on the products and process of IIC. Today, insurance products are so complex that without computerised systems they cannot be provided. Moreover, IT plays a vital role in the communication with IIC's main distribution channel: the intermediaries.

The organisation of IIC is matrix-structured around market groups and regions. A central role in the coordination of IT is given to Program Management, the staff department responsible for IT projects. This department has a central position in our case, as we will see in the next section.

5.4 CASE STUDY: THE EMPLOYMENT OF AN IT EVALUATION METHOD AT IIC

5.4.1 Introduction

This section is the empirical heart of the thesis. The data presented is drawn from the case study at IIC that was involved in the creation and employment of an IT evaluation method. The data are presented in a time-ordered structure. This starts with the creation of the department of Program Management. It is followed by a description of the initial situation at IIC with regard to IT management. Then the developments around IT evaluation and the creation of an IT evaluation method are presented. The way the IT evaluation method is employed in the organisation is then discussed. The section closes with the current and future situation of the evaluation method at IIC.

5.4.2 The creation of Program Management

The introduction of 'IT Economics thinking' in IIC can be traced back to 1996. Contrary to a widespread belief in the organisation that this line of thinking was initiated by the need for cost reduction, the preliminary ideas on IT Economics can in fact be attributed to the overall success of the company. In 1996 the market for life insurance products in the Netherlands was booming, and this continued through 1997 and 1998.

As one senior manager stated: "Every change in products, no matter how crazy, meant more production. [...] Everything sold at that time. [...] We had an extremely difficult time keeping down the profit figures so that we could show the outside world a picture that was a little less rosy, and the same applied to filling our different budgetary supplies, etc. You really were talking profit growths of 40% a year. That was incredible!"

The success of the life insurance products required a totally different approach to products and systems. To exploit the market, the information systems should be able to cope rapidly with changes in insurance products. Driven by the market opportunities, the business demanded a shorter time-to-market of new products and product changes. The existing information systems were not at all suited for flexible and fast changes that were required for changes in products. For this reason, two major projects were planned, both of which were intended to change radically the

existing core legacy systems and convert them to systems that could cope with this demand. Changing these systems had a major impact on the whole organisation since they affected the core of the company, including the employees, their working procedures and the information systems.

To manage these large projects, IIC recruited a project manager from one of the other FGU businesses. At the prior organisation she had been involved in several large projects which were renowned within FGU for their success. Before the project manager was supposed to start these new projects, she was given the chance to get acquainted with IIC and to participate in some smaller projects for the first three months. When general management then asked her to start her job as project manager, they were surprised to hear her decline. She argued that starting these major projects (and all related smaller projects) would lead to major problems as IIC had no clear view on current projects running. Neither did they know how much budget was allocated to them, how project capacity was managed or how these projects were prioritised. As an alternative, the project manager suggested introducing a program management approach in order to manage these projects. General management agreed and the department of Program Management (PM) was created. Since then she has been head of PM.

5.4.3 The initial situation

With the introduction of PM, a new way of controlling IT was introduced. It meant a new project approach towards IT. This approach meant that IT was no longer characterised by unplanned ad-hoc projects where high IT budget overruns were the norm rather than the exception. The first thing that was addressed by PM was to make a list of all projects that were running that year. In 1996/1997, a first version of this 'project calendar' was ready. During the process of establishing this project calendar many things became clear with respect to IT project management: until then projects were started and managed on an ad-hoc basis. They were only structured during system development (using SDM, the Systems Development Methodology), and there was no formal identification of or justification for projects. Moreover, they were not evaluated with regard to possible impact, let alone *ex post* evaluation. Even more so, IIC did not have a clear overview of the projects that it was running.

Questions such as 'what does the project cost? ' and 'what does it deliver?' did not seem to be an issue at that point.

Interpreting the stories of different respondents, IIC seemed like a very chaotic organisation in 1996, which makes one wonder how it could ever be one of the most successful in the Netherlands. One manager illustrates the situation by a story on systems changes and a phenomenon he calls 'unexplainable projects':

"And at that time, costs were not an issue - things were going really well. I saw three projects being carried out that all had the same scope and objectives. Everything was possible since there was no clarity about projects. The director issued an order to SD to adapt the system, and two other people also gave orders to change the same system, and this happened completely independent of one another. There were also projects that had no project owner - we called them 'the unexplainable projects that carried on'. These projects were always passed on to others, and many things were carried out as on behalf of these projects. It even happened that things had been started up as a project in the past had now turned into a complete organisational department."

The SD department was constantly being overrun with projects and requests – much more than they could ever carry out. This caused project prioritisation to be done mainly by SD, which was on the one hand guided by projects that had mandatory requirements and amendments of law and legislation, and on the other by 'managers who shouted the loudest'. Since labour capacity shifted quite often from one project to another, many projects remained unfinished for years.

Though IT costs did not seem to be a real issue and project prioritisation did not seem to be taking place, talking to a senior business manager, we find a somewhat different interpretation:
"I can certainly imagine people thinking we had plenty of money back then. But in reality, in all the 10 years I have been at IIC, costs have always been an issue. And IT and business capacity has always been a constraint. [...]Of course we prioritised, in the sense of making choices. [...] But with the introduction of the methodological approaches everybody now notices [the issues of IT costs, benefits and prioritisation]

more clearly. Also, a lot more people are involved. In the past, it was small group of people operating on their own judgements and gut-feeling."

5.4.4 Development of IT Economics at PM

The insights gained from setting up the project calendar led PM by 1997/1998 to replace the former SDM approach to IT projects with a formal Project Control Method (PCM) which was broader in scope. PCM had a project focus rather than a technical development focus. It entailed project management approaches that structured the project and introduced phases in project planning (IIC-PM 1997). It not only considered technical consequences of the project, but also aimed to control commercial, organisational, personnel, administrative, financial, informational and technical aspects (COPAFIT) of the outcome of the project. In the project process, attention was given to the financials, organisational aspects, time, information need and quality aspects (in Dutch abbreviated by the acronym GOTIK[22]) of the project.

The project calendar raised the question as to why the projects currently on the calendar were actually being carried out: what did they contribute and were they compatible with the direction in which the organisation is heading? Since IIC had no formal strategy, PM decided to try to make the goals of the organisations explicit by interviewing different directors and general management, thus constructing a list of the IIC goals and related sub-goals. The intention was that projects could in turn be related to these sub-goals. However, experiences of PM showed that the exercise proved to be quite hard and resulted in "endless discussions" and "the number of main goals varied continuously in the process between 3 and 10". That did not mean IIC had no goals; naturally there were targets to be met. But to look beyond one year – 'where would IIC be in five years?' – was not a common question. In the end, the only visible result of the exercise was a poster on the wall of one of the offices, labelled by PM as a 'relic on the wall'. Only some 'vague and global' goals had been distilled which could not be made operational in linking projects to them. But, argued one of the respondents at PM, a less visible result was that thinking in the organisation in terms of goals and merits of projects had been triggered. This induced PM to search for advanced ways to prioritise and select projects.

In 1997/1998 a student doing an internship was asked to construct a prioritising method. The 'GAP' method he suggested (IIC-PM 1998), which considered the selection on alternative solutions to a problem by calculation, was discarded by PM as being too mathematical and theoretical. It relied too much on quantifying benefits, which according to PM, was not always possible. They used however the notions it introduced of concepts such as 'criteria', 'critical success factors' and 'measurement' to construct internally a list of criteria by which projects could be assessed on merits. This led to the construction of the so-called Project Characteristics Template (PCT), a template covering one sheet on which projects could be summarised in a few criteria. Using both academic and business publications, and ideas from external consultants and conferences, this soon grew to become a more detailed document. But as we shall see below, it was more than just a document. With it came procedures for constructing such documents, prioritising projects and reaching decisions.

5.4.5 The IT evaluation method

Not only did the PCT give a quick overview of some of the details from all projects, it also made projects comparable. This way projects could be weighted against each other and prioritised. But to do that, more information was needed than what the PCT provided. An IT evaluation method (hereafter: ITEM) was constructed out of the PCT and the GAP method, designed on generally known IT Economics concepts. Furthermore, ITEM was based on concepts from Information Economics (Parker, Benson *et al.* 1988) and the Balanced Scorecard[23] (Kaplan and Norton 1992; Kaplan and Norton 1996), which was on the agenda of many Dutch businesses at that time (see section 5.2.5). Though PM did not use external consultants to construct the method, they made use of the help of an external student (from a university in Amsterdam) and an internal IIC student (a candidate for management development).

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[22] Geld (money), Organisatie (organisation), Tijd (time), Informatie (information), Kwaliteit (Quality)

[23] The Balanced Scorecard advocates a balanced view on IT investments and therefore considers different perspectives. The financial perspective considers the financial goals of the organisational shareholders. The internal business perspective considers the aspects the organisation wants to excel at. The innovation and learning perspective considers how to improve value continuously. The customer perspective considers how customers view the organisation. The Balanced Scorecard intends to balance these four perspectives in order to avoid sub-optimisation (increasing, for example, financial benefits, but decreasing future opportunities through innovation).

Also, at that time, a seminar was held at IIC on the topic of IT Economics by a widely known Dutch consultant and academic Han van der Zee (e.g. Zee and Koot 1989; Zee 1996). These helped them strengthen their ideas based on the (academic) literature on IT evaluation. By 1999, the ideas from the Balanced Scorecard were introduced to structure costs and benefits according to four perspectives: financial, client/market, operational and learning/growth (IIC-PM 2000e).

The *financial perspective* included a calculation of the internal rate of return (IRR), which is an accounting calculation to determine the financial value of the investment (IIC-PM 1999b). The IRR calculation returns an interest percentage for which the investment otherwise should have been put away (e.g. at a bank or stocks & shares) to generate value. Projects with an IRR higher than the cost of capital (i.e. the interest rate of borrowing money) are acceptable. Moreover, the higher the IRR, the more financially interesting the investment.

The *client/market perspective* includes the appreciation of the intermediaries and the way the proposed project increases this appreciation. The *operational perspective* includes the contribution of the project in shortening throughput time or delivery time. The *learning/growth perspective* includes both improvement of the professionalism of employees and the decrease of the time-to-market of a new product.

A deliberate choice to include more than only financial costs and benefits was found necessary since PM regarded the products and customers of IIC as important issues that could not be captured by the financial methods only. Thus, the criteria included effects of the investment proposal on IIC's organisational issues stemming from the Balanced Scorecard perspectives. Experiences with the previous GAP method also showed that these benefits could not adequately be captured by financial criteria. "Financial aspects of the project are regarded as important, but only as part of the bigger picture", argued one PM manager. Therefore, both the financial and non-financial were included.

In addition to these perspectives, ITEM was constructed to take into account the urgency and risk of the project. The *urgency* could be influenced by both external

and internal issues. Externally, for example, mandatory requirements from organisations or government could make the project more urgent than others. Or as a response to competition to avoid a competitive fall back. Internally, projects could be more urgent when they were vital to business policies or required to keep operational systems from malfunctioning. The *risks* of the project include project management risks (i.e. risks of the project process) and project effect risks. The first are related to the GOTIK elements, the latter to the COPAFIT aspects; both are also part of the PCM.

Covering all the above, an ITEM-report format was prescribed to present IT investment proposals with the following aspects (IIC-PM 2000f):

1. Names of related managers: client, information manager, project manager, project leader
2. Starting date and final date
3. Summary of the results of the project
4. Relation to other projects
5. The financial return of the project (internal rate of return based on the following two items)
6. Total investment costs (i.e. costs of IT and business related to the developed system)
7. Financial benefits on increased insurance premium, cost reduction, productivity (efficiency) or market share
8. Effect on the appreciation by intermediaries
9. Effect on throughput time / delivery time
10. Effect on professionalism of IIC employees
11. Effect on time-to-market
12. External urgency
13. Internal urgency
14. Risks in project management (GOTIK)
15. Risks in project outcomes (COPAFIT)

In addition, the ITEM-report required the signature of the related business managers to show his / her approval of the correctness and feasibility of the effects detailed in the proposal.

Apart from the calculations on the financial return of the project, most of these items were in 'free format' – there was freedom in the issues people addressed on each of the points, although there was an instruction document (and an example filled-in ITEM-report) that pointed out issues that might be relevant.

Though intended to be applicable to a broader range than just IT projects, also including other investments than IT related, the actual use of ITEM only considered projects with a significant claim to the IT department (or IT budget). The threshold that would require projects to submit an ITEM-report was set at a minimum of 400 hours of SD. Projects that required less did not require such a report.

Having its origins in Information Economics, ITEM could be classified as a multi-criteria method as opposed to financial, ratio or portfolio methods (Renkema and Berghout 1997b). This entailed much more than ITEM just being some written report. It included a particular view on how projects and criteria should be *scored*, how the projects should be *prioritised* and how a *decision* on projects could be reached. PM describes it like this (IIC-PM 2000e, p.12):
"Before an idea becomes a going project, a process of analysis, justification and prioritising precedes. [...] Within this process ITEM is used to list project proposals, to score and to prioritise. In this, different people have different functions and responsibilities."

Scoring was envisioned to take place by means of a broad group of people who would value the effects of each individual proposal (IIC-PM 2000c). The participants in the scoring group score the projects based on the score model of ITEM (e.g. –1 for a negative contribution and a score of 0 to 5 for a positive contribution). If necessary, scores could be discussed by participants and further tuned. Scores of all participants were combined on each of the criteria in a database and each project proposal thus had a set of final scores. Rather than having one final score for each project, the different scores on criteria were kept so that all projects could be viewed according to their contribution to each of the criteria. The database allowed various views of different criteria, for example, in different scenarios. This was intended to help those who wish to prioritise.

Prioritising was done initially by PM. They constructed advice on the optimal portfolio of projects for general management. In this, the directors of the three market groups assisted PM. Prioritisation was based on the fit between the scored project effects and the organisational strategic goals and bottlenecks given the available budget. The prioritisation included a check on technical feasibility and practicability. The IT departments of SD and Infrastructure were consulted for this check. PM then presented the final advice to general management. In turn, general management would make the final *decision* on prioritisation. To selected proposals, they granted budgets, which by then had become projects.

ITEM entailed both a process (of scoring, prioritising and decision-making) and several documents. The complete IT Economics method comprised (IIC-PM 2000e):

- the ITEM-document, with an assessment of the effect of a proposal in terms of costs, benefits (both financial and non-financial), risks and urgency that justifies the investment;
- an internal rate of return document, a calculation sheet for calculating the financial rate of return for the proposal, where financial costs and benefits are analysed based on a 6 year timeline (IIC-PM 1999a);
- a scoring process for valuing project effect;
- an automated database used to generate and support prioritisation based on the scoring process and a statistical analysis;
- a prioritisation process for determining the ranking of project proposals;
- advice to general management about which projects should receive a budget (the priorities proposal);
- a decision process by general management that decides which proposals will be granted a budget.

It is visualised by PM in Figure 5.2 (adapted from IIC-PM 2000e). Summarised, the phases of carrying an idea to a project were:

1. The business creates ITEM-reports for their new investment plans and ideas (which require over 400 hours of systems development), including an IRR calculation;
2. PM checks the ITEM-reports on accuracy and completeness;

3. ITEM-reports are scored by (a group of) business managers;
4. Differences between scores of managers are tuned by discussion;
5. Final scores result in a preliminary list of prioritised proposals;
6. The preliminary list is prioritised by PM and market directors;
7. The prioritised proposals are checked on technical feasibility and practicability;
8. The feasible prioritised list is presented to general management in a prioritisation proposal;
9. General management determines the final priority list of projects;
10. The final priority list is communicated to the business;
11. The approved proposals are granted budget and become projects.

As is visualised in this figure, ITEM is actually the first step of the PCM. After general management agrees on a final list of priorities, the investment proposal becomes a project. By applying PCM it is further shaped into a project by making plans and project analyses and is then carried further through different phases (from idea and planning phase, to project definition, design and implementation). After implementation, PCM discerns a (continuous) phase of usage and management of the resulting information system.

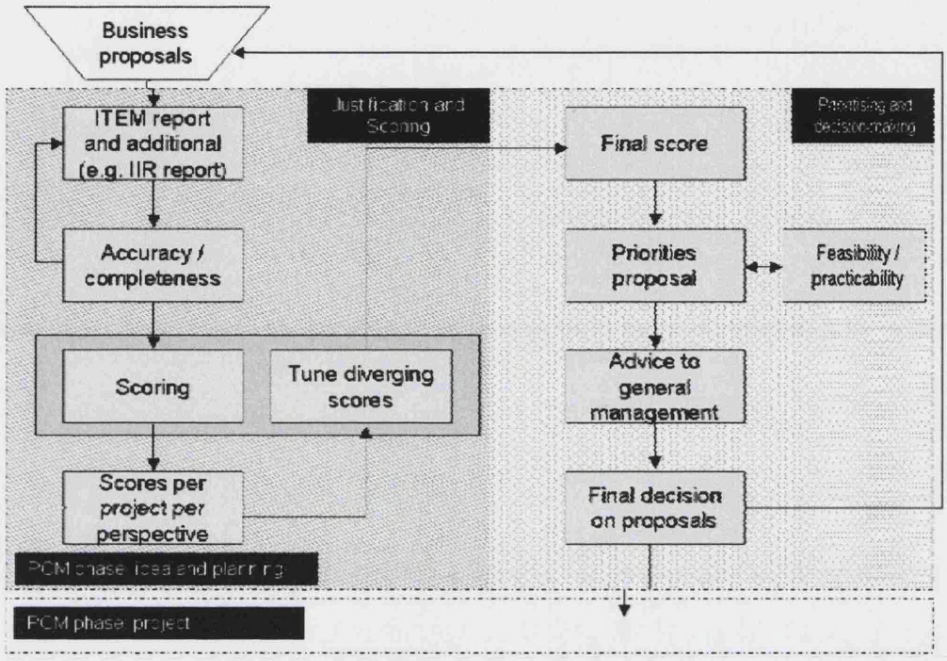

Figure 5.2 Visualisation of ITEM

Thus, the first ITEM-report was developed in 1998 and with it, ITEM was created. According to an internal report by PM describing the methodology, "the method excels in simplicity, objectivity and uniformity" (IIC-PM 2000e, p.2). Its ultimate goal is to assist in making a "right prioritisation" (ibid, p.1) to "improve the effectiveness and efficiency of the portfolio projects within IIC" (ibid, p.2).

Though the way ITEM was used, as we shall see, was very dynamic over time, the ITEM-report underwent only minor changes in its first year. During 2001, however, the criteria discussed in the ITEM-report can be seen to have replaced the Balanced Scorecard elements to elements from the explicit strategy of IIC. The reason for this is that the general management of IIC by that year had made its strategic focal points explicit; something which at the top organisational level was by then a visible trend in more financial organisations. The seven points of this strategy replace the four perspectives of the Balanced Scorecard. These points include a strategy on product innovation and reduction, a strategy on operational excellence and a strategy on e-business. For example, under the point of product reduction, special attention was given to the way a project proposal was geared to eliminating loss-making insurance

products. Under the point of e-commerce, attention was given to how a proposal helped improve the communication to clients and intermediaries.

Moreover, by 2001, specific attention was being given to the various costs of the project. Whereas the ITEM-reports in 1999 and 2000 only asked for costs related to the information system (i.e. IT costs for development, testing, training and user related costs), by 2001 the costs over a broad spectrum were requested (e.g. including marketing and promotion costs, costs for organisational change, costs for juridical assistance, etc.). Costs were now requested on all COPAFIT aspects.

5.4.6 Introduction of ITEM to the business

ITEM had already been developed in 1997/1998, but it was not until the end of 1999 that it was widely spread throughout the organisation, and ever since it has been used for dividing up the budget. In fact, the first phase of the PCM, which was introduced around 1997/1998, had already requested an ITEM-report as deliverable of its "idea & planning" phase.

However, the introduction of PCM itself was not without difficulties. It was initiated by PM at the SD department, the only department that was accustomed to working with project management instruments (such as SDM) before. Though PCM supposedly was intended for general business projects, the strong link with IT-related project management is recognisable in expressions used in PCM. "Functional" and technical design" are typical project planning phases related to systems development, rather than phases of other business projects (e.g. reorganisation or marketing project). Business managers were not too eager to adopt PCM according to some because 'it did not relate to their way of thinking'. An internal assessment by IIC concerning the usage of PCM reports that by the end of 2000 a lot of people were claiming that they used PCM, but in practice it was only used in a limited and partial way (IIC-PM 2000a; IIC-PM 2000b). In fact, the assessment states that by then only the 'planning phase' of PCM, which is actually related to ITEM, was carried out – project definition, design and implementation do not use the tools PCM offers or make use of formal evaluation points in time.

Since PCM had not been implemented throughout the organisation, before 1999 the ITEM-report was hardly used in practice. Moreover, some respondents even contend that the first phase of the PCM was skipped on a regular basis during this time. The reason for this can be traced back to senior managers and directors. They were more interested in the results than the planning. On the one hand, they urged SD and managers to carry out the projects as soon as possible, while on the other hand they provided extra funding for projects – even without the involvement of PM. One manager argues: "When the project manager showed up with the project description, the business director asked: 'What are you doing now? A project description? Just leave it at that and get on with carrying out the project.' Well, that is our kind of culture. The intentions are alright – they really are convinced that they have found the ultimate idea and put pressure on the organisation to realise it. The idea might be great, but they forgot to look for alternatives, requirements, etc. It was very common that systems had been built that afterwards had to be partially or completely rebuilt, because only at the end of the day did the real desired functionality become clear."

However by 1999, this situation changed. With the introduction of new procedures for project budget allocation, ITEM-reports became a major requirement in order to receive budget. On 8 December 1999 PM sent a memo to the information managers, SD account managers and Infrastructure account managers. It explained the procedure by which project budget 2000 would be allocated. The addressed were asked to hand in ITEM-reports regarding the planned and continuing (IT) projects in 2000 before the 15th of February 2000. According to the memo (IIC-PM 1999d, p.3), "only projects that fulfil all requirements will be dealt with by SD". One PM employee explains the message PM communicated to the rest of IIC: "The strong message was: he/she who does not join in the ITEM-report round does not join the round of prioritising. If you do not hand something in, you do not get approval. So it was agreed with general management."

There is no single reason for this change in budget allocation and project prioritisation. One of the frequently mentioned reasons was the need for cost reduction which became important in 1998. The market for insurance products had changed and profit margins decreased. A report published by FGU in 1998 highlighted the relationship between IT costs and benefits and alignment between

business and IT. This also had its impact on general management's thinking, which after all had to account for their financial results to FGU. Moreover, in that year a new general manager for IT came to IIC. He brought along a strong focus on IT costs and benefits. Ironically, the better insights in IT costs already gained from the first activities by PM and IT also increased cost awareness at the level of general management. Undoubtedly, the need for IT cost reduction was one of the major reasons for the necessity to make selections in projects, since not all projects could be funded anymore.

An issue that already was a prominent factor for the requirement of prioritisation was the limited IT labour capacity. This issue grew more and more at the end of the nineties. IT labour capacity in the whole of the Netherlands was scarce. Moreover, a lot of the capacity was claimed by so-called *must-do* projects, such as conversions needed for euro and millennium developments. Moreover, a radical change in Dutch regulation required some major changes on the systems, something that demanded IT capacity as well (see section 5.2).

Another major issue was the reorganisation of IIC, which entailed the merger of the prior business units within IIC to a new market-focused structure (see section 5.3.2). Because of the integration of business units, the three different systems development departments merged into one. With the integration of the three IIC business units, the total systems development capacity was centralised. Instead of each business unit having their own systems development department, they now had to staff their IT projects from one central pool. Decision makers were faced with choices to make between the three columns – a process that was new to everybody. Up until then, they only had to make decisions within their own line of business. Suddenly, they had to consider the whole organisation in their decision process. The previous ways of prioritisation and considering impacts of investments to the organisation no longer applied. Nobody in the organisation could oversee the overall totality which led to the need for a more so-called 'objective evaluation method'.

Moreover, the method not only had to be used to improve decision-making, but also as a means of communicating and legitimising decisions to the organisation. According to one manager: "We noticed we lacked a certain tool, a certain

uniformity in our decision-making, with which we could serve all our users in an equal way; a tool we could use to convince them of the choices we were making. [...] Having to make choices is not that difficult. If I am told to choose, I will. However, it is more of a matter of convincing others of the choices I have made. Therefore, we needed a tool."

So although prior use of ITEM-reports with certain projects had occurred, the wide-spread distribution of the format including the related procedures started for various reasons at the end of 1999 – parallel to the new procedures by which budget for 2000 would be allocated to IT projects. The persons to fill in the ITEM-reports typically were the SPS managers at the three market groups. The distribution of ITEM to them took three channels: written instructions, some workshops and the information manager.

The first channel, written instructions, included a memo detailing the phases of ITEM use (IIC-PM 1999d), instructions on how the ITEM-report should be completed (IIC-PM 1999c) and an empty ITEM-report form. In addition to the written instructions, a second channel of communicating the use of ITEM to the business was through organising workshops. PM managers organised some workshops with different business managers explaining the written material on ITEM.

The third channel of communication to the end users was the information manager. The function of information manager was new to IIC since the beginning of 1999. The information managers functioned as a communication partner from PM to the end-user and vice versa. They distributed the ITEM-report format to the end users and made sure the process of ITEM-report fulfilment was carried out. More importantly, they convinced the business of the need for the process. The information manager, as a staff member to the business unit director, was in a good position to ask the business to make an effort to use ITEM. He had both good access to the business and to the director, with whom he could discuss the importance of ITEM.

From the business managers, PM found little direct opposition to ITEM. Most questions were related to some lack in the clarity of the ITEM-report. Only one

business unit had a different reaction. The unit arranged a meeting with PM, questioning the need for the introduced method. In their questions relating to the process of handling ITEM, PM found backup from the information managers, since the information managers were strong supporters of a better link between IT and business impact. With their support, the part of ITEM concerning the construction of ITEM-reports found its way to the business.

Although the SPS managers were instructed on how the use ITEM, and PM received few questions about this, the writing of the ITEM-reports was not without its problems. The SPS managers had different backgrounds, as diverse as technical specialists, project specialists, process specialists and business specialists. Just a small number of them was familiar with a broad view on investment proposals. One information manager reports typical questions asked by SPS managers, such as "What is an IRR?" and "effects on market share? How do I know?" Although ITEM supposedly had been constructed to be simple and plain with good documentation, in practice it required both specific knowledge and experience to be able to cope with it. As a result, some ITEM-reports focused only on technical aspects, whereas others focused primarily on business benefits. Moreover, the ITEM-report was regarded by some to be more of a checklist than supporting a justification, scoring, prioritisation and decision process. Rather than taking the time to think proposals through and consider thoroughly the costs, benefits and risks, ITEM-reports were thoughtlessly filled in within a short period of time. Rather than using it as strategic or tactical instrument, it was used as an operational tool. What actually should take weeks when done properly was finished in one afternoon, so tells one information manager. To him it was not surprising since operational managers, not strategic managers, were asked to do the job. He argued for specially training some SPS managers in the trade of constructing ITEM-reports, rather than ask all SPS managers to take on the job. He asserts that constructing such reports is a speciality on its own; it requires insight into technical, business as well as economic aspects.

In practice, some SPS managers actually demonstrate that already they had found a way to dodge this. SPS mangers who felt familiar with the way of thinking demonstrated in ITEM also wrote ITEM-reports for others. One such SPS manager states that others were overly anxious not to commit themselves to ITEM-reports –

"*you* can do it, just let me solve my technical system problems". According to her, this is not a matter of better education or explanation regarding ITEM; or of being able to oversee the broad scope of project proposals, or to having the patience to gather relevant information from different sources and to write such documents, but instead is something that should 'suit' you. Thus, the reality of the situation was that ITEM-reports were drafted by only a handful of SPS managers, specifically those who felt at ease with ITEM.

Another difficulty in the process of constructing ITEM-reports was the requirement of the Financial Department to assist in calculating in the IRR. In fact, PM demanded that the Financial Department carry out IRR calculations. However since the Financial Department did not have all the underlying assumptions on project proposals, often additional communication with each of the three SPS departments was required. When SPS managers were busy with other activities or not present at that time, the process was delayed or lesser quality was accepted. In addition, a financial manager notes that too often project leaders had not secured the commitment of business managers for their estimated savings. That means that projects that promise high financial benefits might not be able to be realised because the involved business managers are not committed to obtaining them (e.g. to make the required changes in work processes or decrease the number of employees). One example is an instance where the Finance Department received a project promising to deliver 1 fte[24] savings in their own department, but they themselves had not been consulted about it. This problem is related to the fact that often the benefits of projects reside somewhere else in the organisation rather than with the department that makes the project proposal. Although in theory FD should validate all such financial assumptions underlying the proposals, the manager contends that in practice this is simply impossible. Under the pressure of time therefore, the IRR calculation is often made only on the basis of provided financial estimates and without a second opinion on these estimates. Moreover, FD is aware of the difficulties in estimating certain benefits related to IT. One anecdote is the justification of an investment in a company-wide Intranet which was said to save each IIC employee 10 minutes a day. The financial manager contends that in these cases it is better to argue that IIC

[24] A cost reduction equivalent with one full-time-employed (fte) employee.

simply needs an Intranet for its normal functioning, rather than trying to make a financial estimate for it.

Conflicts between SPS and the Finance Department due to ITEM can be clearly illustrated by a story told by one SPS manager who drafted a proposal for a project which would relieve the workload of a particular operational specialist. "The specialist would save about half his time if this project would be carried out. Being one of the few specialists with knowledge of a particular system, it would be a very welcome relief for the whole department involved. The idea was that he now could spend time addressing other issues with regard to that system, ones that urgently needed attention. But the reaction of the Finance Department was that his time savings were not actually a savings at all since he was not losing 50% of his employment. Therefore, costs would remain the same! For the Finance Department, the project delivered no savings. We did not know how to quantify the benefits of the project in another way. The specialist was not going to deliver more products – only address arrears work. To the Finance Department the benefits of the project were zero. But for people on the work floor it would have meant so much relief!" The SPS manager solved the problem by viewing the additional categories ITEM provided to show the benefits of the project. Benefits such as increased knowledge due to the specialist possibly training other people in his or her spare time and increases in professionalism, were thus selected. "You go about quite artificially, trying to fit the benefits somewhere. You think to yourself: at least I can get a positive score on those items, because on the other items there is no chance."

One SPS manager adds another perspective to problems relating to the ITEM-reports. It concerns the perception of SPS managers that ITEM came from the System Development department. The relationship between SPS and SD had always been that of customer and supplier. This had had its typical problems (e.g. Applegate, McFarlan *et al.* 1996 show that similar problems occur commonly between IT and user departments): SPS managers complaining that SD managers took too long to build or change systems, and SD managers likewise complaining SPS had been too vague or too late with their requirements. In prior years, SD had been involved in different quality improvement programs (with quality improvement programs, such as the Software Improvement Process and the Capability Maturity Model). Although

not actively involved in these programs, SPS managers were faced with all kinds of techniques and models introduced by SD. For example, as part of these improvement programs, change request related to IT now had to be filled in using particular forms that contained specific language related to these programs. In other words, SD had confronted SPS in the past with all kinds of forms, methods and particular requirements. ITEM, being related to IT, was perceived as one of these improvement programs coming from SD. ITEM-reports having some similar terminology as the prior SD improvement processes, strengthened this idea. The somewhat strained relationship with SD thus placed ITEM in a poor light for SPS. It was not received too positively and motivation to work with it was not high.

One of the major difficulties in drafting ITEM-reports, an SPS manager notes, is gathering the relevant data. For development costs and IT capacity it inquired at SD. However, to estimate benefits, more often than not, information is required from particular specialists who are vital to operational business – "it is always the person who is the busiest you need for your information". For example, they must be probed for the potential impact of the investment on their work processes. Moreover, asking these persons to free time to deliver information for ITEM-reports proved to be hard. According to formal IIC regulations, a written request should be made two months before the time and efforts of the specialist are required. However, that was impossible given the limited time available to fill in ITEM-reports.

Despite the difficulties in constructing ITEM-reports, by 15 February 2000 all required ITEM-reports were completed and turned in to PM. However, PM was not satisfied with the quality of the ITEM-reports they received. Especially the quantification of costs and benefits left room for improvement. Also in many cases, when asked for risks in carrying out the project, people had written 'not applicable'. Risks of the project had not been made as explicit as PM had wanted.

PM explains the lack of quality in ITEM-reports as being due to different reasons in the business. One manager contends, "we [at IIC] do not yet know how to look further (beyond 1 year). Absolutely not. That remains a big challenge. People cannot do it, do not get it, do not want it or find it boring. It figures. 'And what is the result?' [they wondered]."

The problems relating to quality in ITEM-reports might not be such a great problem as might seem at first glance. According to a business director:
"The initial quality of the ITEM-reports left room for improvement, let's put it that way. [...] However, general management is not making decisions based solely on these documents. When general management needs to make decisions, it turns back to the business – general management is only human too. They go back to the business and form an opinion on the information they get back from their colleagues. [...] If you do not know the background of the proposal and would just use the ITEM-report for decision-making, that would be too mechanistic. That is not the way it happens in real life."

An information manager argues that the step PM wanted to make was perhaps too large a step for the organisation to take. He contends that "the organisation has to grow into the process. We cannot just take a standard method and implement it in the organisation. We have to go through some stages. We have to grow into the competencies needed to exploit such a method."

In March 2000 a meeting was planned by IIC's general management to prioritise the projects that were submitted. Before this meeting, the process of scoring by managers was planned by PM. The goal was to provide general management with an overall project portfolio proposal and thereby assist them in making decisions.

5.4.7 Prioritisation 1999/2000 – a first time

In the first round, the process delivered 52 ITEM-reports. Due to the large number of reports (and large amount of data the ITEM-reports delivered – the ITEM-reports were bundled in 'books'), they were divided in two to prioritise by a scoring group.

PM asked all directors of market groups, the regions and some staff departments to score (twelve people in total); ten were willing to do so and in the end eight actually did. Each of them was asked to score all ITEM-reports (e.g. to give a score ranging from -1 to 5 on each aspect of a project). All scores by each scoring member were put into a database. By statistical comparisons an analysis was made on the final

scores of the proposed investments. PM stated that "when this analysis shows that too large deviations appear between scores to come to end scores for certain items, then a group discussion will be organised. In this session the group will come to an end score for the relevant items by group consensus" (IIC-PM 2000d, p. 2). However, PM managers concluded that the scores were not statistically different among the eight, and only one difference was resolved by communication of e-mail. From the database, PM created an overview of the projects from different perspectives (product variation, market segmentation, etc.). The priority list was presented to general management in March 2000. But rather than taking the advice to carry out the prioritised selection of the projects, general management decided to approve all 52 projects by granting more budget. Moreover, general management argued that due to external developments some projects would, during the year, prove to be unnecessary and thereby give more room to the other projects. When this wishful thinking did not occur, general management was forced to make additional decisions on projects and some projects were passed on to the next year.

The reason for approving all projects was a result of the great many projects that had a must-do status. Due to the large number of projects necessary because of the euro currency adjustments, millennium and mandatory changes by law and regulatory changes, only a small number of projects remained that were eligible for choice of investment. Because those remaining constituted such a relatively small number of projects, general management decided to allow all projects that had a valid ITEM-report to carry on. Apart from the negative effect on the motivation of managers to cooperate in a new round of prioritisation, it also had some negative effect on other PM plans. Rather than a one-time prioritisation, PM had intended to institutionalise an on-going prioritisation of projects with a so-called 'rolling-calendar' where projects were monitored throughout the year. But because all projects had been approved right away, the extra prioritisation was made redundant.

In retrospect, the first use of ITEM shows some mixed results. An evaluation of the scoring group shows that they had been able to make scores, but the quality and meaning of the texts in the reports was too varied for them to be very confident in their scores. In an informal evaluation memo (IIC-PM 2000g, p.1), PM notes that ITEM had provided increased understanding of the aims of projects, it increased the

involvement of region directors in the process of project proposals and it induced project developers to thoroughly think through their ideas. On the downside, it notes that the quality and depth of ITEM-reports was low, that some market group directors felt passed over in the scoring process and that general management did not have a set of goals on which to rely to support its decisions.

Moreover, although prioritisation had taken place, by the time projects were ready for executing, new discussions arose. Estimations of needed capacity for projects proved to be incorrect. As a result, projects that had been approved were delayed.

PM concludes in a formal written evaluation of the first use of NW-documents and the prioritising process (IIC-PM 2000e) that "the method proved to be very useful and valuable for the organisation. The organisation has become more critical. People are better at thinking through their projects, because a thorough study has to be carried out to write ITEM-reports". The report shows a much brighter perspective on the use of ITEM than the interviews do. Rather than suggesting changes in the approach to prioritisation, scoring or decision-making, the formal evaluation report only suggests some minor improvements relating to the contents and textual format of the method.

5.4.8 Prioritisation 2000/2001 – a second time

At the end of 2000, a new round of project prioritising had started to set up budgets for the year 2001. All business units had to hand in their new project proposals. This second round of prioritisation has been characterised by one of the PM employees as a 'black page'. Not only because the quality of the ITEM-reports was still unsatisfactory, but more importantly because the process of scoring and prioritisation went differently than planned.

The quality of ITEM-reports still was not satisfactory to PM. Some persons even regarded the quality of the documents to be worse than the first time. This was due to a number of factors: other people were involved and experiences from the last time were lost; people were busy carrying out projects from the first round, demanding time from IT people to do some work and also time to help them with estimates for completing ITEM-reports; and people thought it would be as easy as the last time,

and they would all get the budgets anyway. In addition, people underestimated the time it would take to make a proper proposal.

The major reason for this prioritisation to be described as a 'black page in history' is the way the process proceeded after the construction of ITEM-reports. Rather than asking the market and some region directors to prioritise the projects by giving scores, PM planned a session where six directors were present. The aim of the session was to come up with a proposition for general management about which projects to approve. Again, the total number of project requests from systems development was twice the available capacity. The proposition was intended to be created by an agreement among the senior managers. However, no agreement among the managers could be reached mostly due to the fact that everybody was pleading for their own projects.

The managers did not reach consensus on a plan that fitted the available capacity. As a result, PM handed over a list of, according to them, must-do projects to general management. General management however concluded that several projects without the must-do status, but which were crucial in their own view, had to be carried out. In the end, general management spent two days at the beginning of 2001 prioritising all the projects on the list which resulted in the project calendar for that year.

In the prioritising process of general management, in which ITEM only played a very minor role, decisions were reached that were not at all clear to the business. Some projects that were regarded urgent by the business managers were scratched in the meeting.

At the end of the second prioritisation round, general management commented: "This actually is crazy. [By prioritising ourselves,] we are doing the work of our business directors. We do not want to do that." They asked PM to come up with a solution. PM came with the solution of a prioritisation platform: the IIC Portfolio Management (IPM) platform.

5.4.9 A prioritisation platform

The idea of a prioritisation platform had already been launched at an earlier point in time. But, as PM observed, "a real decision from general management had to be

issued before it actually took form." A possible reason for this delay, suggests a manager at PM, was that such a platform proposed little benefit and was a real threat to many of those involved. It proposed a risk in that people could lose the few things they had. And past experience had shown that they could get extra budget from a director during the year.

At the start of 2001 the platform was created. Besides the evident cause of the failure of the second prioritisation round, there were other reasons why such a platform could count on more support by that time.

PM noticed a shift in the people involved in prioritisation. They started to think more from a IIC perspective rather than from their own market group perspective. "A movement occurred in the sphere of interest of the people involved." This view is supported by the interpretation of a market group director who says: "With the organisational change in 1998, people came into new places. At that time, the idea of independence was propagated. Managers were responsible for the success of their part of the total IIC organisation. But concern for the larger organisation faded into the background. [...] People had the feeling they had to prove themselves in their new positions. This feeling decreased through time. Instead, people are now thinking that it is ridiculous that we cannot agree on these things.'"

Moreover, some argued that PM matured in its role as well. A market group director explained: "It used to fulfil a role of administer and bookkeeper. Now it plays the role of catalyst in the decision-making process." Whereas PM was first only seen as an organisational unit that makes an inventory of investment proposals, now it is considered to have matured into a business unit that makes informed suggestions to the prioritisation platform. By taking a lead in the discussions in the platform, PM is better capable of avoiding the things that went wrong in the second prioritisation round.

Other respondents such as the information managers saw it somewhat differently. They argued that business managers have matured in managing IT. Whereas before PM was seen as the one to solve the IT decision problems, by now managers (both general and business management) had become aware that they are responsible for IT. PM received a supporting role in presenting a particular view on these problems,

but it was up to business management to solve them. In other words, PM was not in a position to prioritise and thereby solve the problems of limited IT budgets and IT capacity – they could only support this problem-solving. By installing a prioritisation platform, this awareness was translated in the involvement of more business managers in this process. In this view, general management should not address PM to reduce IT costs (by limiting their budget) but should instead address this to the business managers. Such a perspective is supported by the Finance Department which has expressed doubts about the way IT budget is currently allocated centrally to IT. In the meantime, however, it is up to business departments to decide how to spend it.

5.4.10 Current and future situation

In the situation at the time the research was conducted, all respondents regarded ITEM as being employed by the organisation. It has become common practice to fill-in ITEM-reports when a new project is proposed. PM notices that people come to them to request the ITEM-report form when they want to start a project and information managers notice business managers telling each other not to forget to use ITEM. ITEM is also considered to be the normal road one has to take in order to get project approval; without an ITEM-report, projects do not enter the project prioritisation and decision process. Moreover, SD no longer works on projects that have not been approved. They first ask for projects to be put on the project calendar, something which requires an ITEM-report, before SD will start working on them.

Not only has ITEM become regarded as integrated in the business, it also is regarded as an improvement to the (lack of) prior evaluation practices. The financial department argues that ITEM in making explicit assumptions, supporting budget allocation and leading to more disciplined use of budgets is a step in the right direction as opposed to previous practices where IT budget overruns were the norm. IIC has changed to be more cost-conscious in IT projects. Moreover, ITEM filtered away initial ideas that could not yet be worked out thoroughly. In the past these proposals slipped by, but now they are already halted at the very start. They do not enter the process of prioritising at all.

Business managers contend with regard to the overall success of ITEM that "now we really make plans, make choices and follow projects. Everything is much more methodical and structured" than it used to be.

However, although the format has been adopted, the use of ITEM differs from the way PM intended. The quality of ITEM-reports in their view could be improved. People continue to fill-in the document at the last minute and leave out information.

More importantly, ITEM is only used during budget allocation. There is no *ex post* evaluation to match results with project goals as stated in the document. A number of respondents have pointed out that as long as there is no *ex post* evaluation, the quality of ITEM-reports in terms of accuracy of estimations will not improve. They expect the figures in the ITEM-report to become more 'realistic' once an *ex post* evaluation is part of the process. IIC is looking for ways to incorporate such an evaluation in the process. The financial department states that if no *ex post* evaluations are made, *ex ante* evaluations are redundant. However, with ITEM providing an *ex ante* evaluation, it lays the foundation for *ex post* evaluation. This should be the next step.

In the future situation, respondents see ITEM as an integral part of the organisational process. The results ITEM produces will be used throughout the investment process, starting with budget allocation and going on until the *ex post* evaluation of performed projects.

Moreover, some information managers argue that in the future ITEM should play a more strategic role in the organisation. They argue that currently it is perceived as an operational instrument to determine yearly budgets. ITEM is applied to project proposals for projects for the next year. They argue ITEM should extend its time span and include ideas that are further down the road. It should feed strategic open discussions on the direction in which IIC should be heading – not merely arrange financial budgets for ideas that already have almost reached an operational project status. Whereas others stress the importance of operational tasks of the new prioritisation platform to include project monitoring, the information managers argue

that the platform should try to look ahead and advise general management on strategic routes and not only operational ones.

5.4.11 Conclusion on the case study

Since 1996, IIC has come a long way with regard to getting a grip on the economic aspects of IT. An overview of relevant events is presented in a timeline displayed in Figure 5.3. All respondents see the introduction of the project calendar and ITEM as an improvement in handling IT projects. Although some notice that the ultimate goal of an ideal rationalised grip on IT may never be reached due to the flexibility to shape the ITEM-reports and difficulties in making valid estimates of all benefits, they regard ITEM as major contribution to IT decision-making and communication.

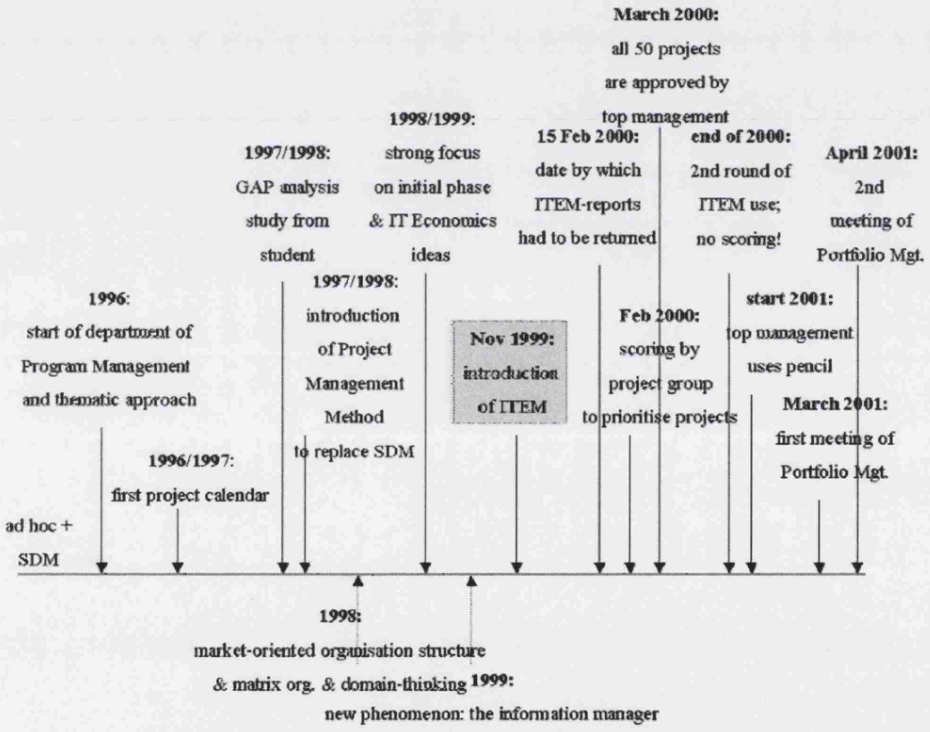

Figure 5.3 Series of events in the employment of ITEM

5.5 CONCLUSION

This chapter has presented our case study and its context and history. It shows that from a contextual point of view it is not so strange that our case study organisation

started to show interest in IT evaluation concepts during the '90s. Many contextual developments have urged companies to get a better grip on the costs and benefits of IT, and this in turn has fuelled the need for an IT evaluation method. The events that occurred during the studied period have been detailed. These will be analysed in the next chapter.

Chapter 6: Case Analysis - From Adoption to Translation

6.1 INTRODUCTION

In the previous chapter we described what happened at IIC during the introduction of the new evaluation method ITEM. In this chapter we discuss the case by applying the theoretical insights as outlined in Chapters 3 and 4 and attempt to explain[25] why this process happened the way it did. The issue we address is to see how we can understand the employment of IT evaluation methods better when we draw on insights gained from our case study.

The case of IIC is analysed from two different theoretical perspectives in an attempt to gain a deeper understanding of the employment of IT evaluation methods: an analysis using the diffusion theory and an analysis using ANT.

As explained earlier, the diffusion theory is a very generally applied research approach to analyse the adoption and spread of innovations. Therefore, it seems justified to use this theory to see how much understanding can be gained in analysing the case study. Although many limitations with regard to the diffusion theory have been pointed out in Chapter 4, we will employ it here to analyse our case and see where it leaves questions unanswered in understanding the IIC case. We will further show how using the actor-network theory in this particular case study provides a better understanding.

In the analysis we will show that the introduction of ITEM at IIC can best be understood as the mobilisation of an actor that translates and is translated. The perspective of the evaluation method as an acting actor helps to understand the dynamic process of the introduction of ITEM at IIC. In the next chapter, we will take

[25] In section 4.3.4 we discussed that in ANT explanation is used for describing in detail the events that took place in this case, rather than explaining findings from generalised social theories. Explanation thus should be understood as presenting the events from the case study in such a way that they become clear (make sense) to the researcher and the reader.

this further and try to come to a new perspective on the employment of IT evaluation methods in general and address the paradox stated in Chapter 1.

6.2 AN ANALYSIS USING DIFFUSION THEORY

6.2.1 Introduction

In this first analysis we will use the diffusion theory by Rogers (1995) to analyse the case study. In applying this theoretical framework, we follow a common thread in our analysis according to his five stages of diffusion (knowledge, persuasion, decision, implementation, and confirmation). Furthermore, we study other concepts of diffusion theory, such as the characteristics of ITEM (relative advantage, compatibility, complexity, trialability, observability) and re-invention. We conclude with whether or not the adoption according to our diffusion-theory analysis can be considered successful, and we identify which questions are left without a satisfactory answer.

6.2.2 ITEM seen as the adoption of an innovation

According to Rogers, an "innovation is an idea, practice or object that is perceived as new by an individual or other unit of adoption" (Rogers 1995, p. 11). Since ITEM was a new approach to the economic valuation of IT for IIC, it can be viewed as an innovation. From the perspective of the diffusion theory, the research analysis can be seen to promote an understanding of the difficulties related to the *adoption* of ITEM. To define the innovation, we consider ITEM to be the evaluation method that encompasses the ITEM-report which describes costs, financial benefits, intangible benefits, risks and scoring tables for prioritising. But ITEM was more than just some report on paper. Its explicit goals entailed the justification, scoring, prioritisation and decision-making of investment proposals. The innovation thus entailed both artefacts (documents, written instructions and a database) and processes (justification, scoring, prioritising and decision-making).

PM intended ITEM to be a neutral, universal method that unified proposals in such a way that they could be prioritised objectively. Decision-making in this view can be seen to be based on the rational decision-making model. In other words, when all the alternative investment proposals have been ranked, the best choice can be made

(objectively). This rationality discourse expressed itself during interviews with PM employees and with some managers and was evident in several documents regarding ITEM. It can be seen to be inherent to ITEM itself – e.g. the scoring of alternatives in which the best choice of investments can be calculated.

6.2.3 Becoming aware of the need for ITEM

To understand the adoption of the innovative ITEM, the diffusion theory suggests an analysis of the prior conditions that led to the awareness of or need for an innovation. Prior conditions significant to the adoption were visible at the beginning of the '90s.

Before 1996, IIC found itself in a seemingly very comfortable position. The market for insurances was doing well, and IIC was exploiting these conditions in a favourable way. So well in fact, managers had to search internally for ways to obscure their successes to the outside world. Things were going so well that products were sold even before they had been completed technically. The marketing people sold, sold and sold. In our case study, one manager mentioned a product that was intended solely for entrepreneurs but was sold to private individuals just the same – "Back then, people were eager for insurance products."

But the success on the outside had its toll on the inside. The heated market was demanding more products, and with the marketers selling all kinds of innovative products, the clockwork that produced the products was being put to the test. At the basis of the products lay complex information systems which had been developed and changed throughout many years. Insurance information systems constructed many years ago had evolved due to the introduction of new products, innovations in products, removal of products and impact of adaptations required to meet laws and regulations. As a result, many 'patch-work' and workarounds had been introduced into the system, and it proved difficult to remove the old parts of the systems. Changes that were considered temporary became permanent and due to impatient demands and low development budgets, a lot of system changes had not been developed as neatly as system developers would have wanted. By that time, IIC's information systems were referred to as 'legacy'; they were old, complex and inflexible systems that carried past burdens (other insurers faced similar problems – see section 5.2.4).

Another thing that contributed to systems becoming complex was the culture and external image of IIC. During its long history, IIC had acquired an image of a large and powerful company. This image was expressed not only in its business operations and relations, but also in other ways, for example by the impressive and prominent office buildings of the company. Being one of the biggest insurance companies in the Netherlands, its powerful customers and intermediaries had high demands and expectations. By the '90s, these historical successes resulted in IIC acquiring the status of usually being able to live up to these expectations – the creed adhered to seemed to be 'your wish is our command'. Upholding this image meant that through the years various requests for system adaptations of important intermediaries were granted. Legacy systems thus became even more complex.

From 1998 on, other conditions drove the innovation of IT evaluation further. An increase in cost awareness heightened the demand for better insight into costs and benefits, in particular the need to get a better handle on future IT investments. Additional drive for IT evaluation came from the evaluation practices at IIC before 1998, which were characterised by respondents to be suffering from unknown IT costs, unplanned IT resource use and decision-making based on gut feeling. In addition, the group of insurers and banks within FGU, including IIC, all had numerous experiences with costly failures in automation projects.

Moreover, competitors were involved in all kinds of IT Economics and quality improvement exercises. Back then, these types of management issues were considered important (the 'hypes' and 'buzz-words') in banking and insurances (see section 5.2.5). One business manager contends that "ten years before, no one thought of methodical and structured approaches towards projects or IT. Neither at IIC, nor at any other financial companies. That thinking arose during that time." Another manager confirms this and adds that consultancy companies that were operating in the financial sector at that time increased such awareness.

These conditions led to a need for change. It remains unclear which came first, the need (e.g. 'market pull') or the awareness of a new evaluation method (e.g. 'technology push'). It is most likely that one influenced the other. In any case, PM

saw itself confronted with the issue of evaluation. By combining ideas from different methods from research (IT Economics and Balanced Scorecard) and models already used in IIC (PCT, GAP-analysis), they created ITEM.

It is difficult to determine which business units actually were involved in the decision to use ITEM at the end of the '90s – PM started to inform departments about the possibility of introducing ITEM, specifically those departments that felt the need for better insight into their projects. An actual decision to use ITEM was made at each unit individually. Then again, a formal decision to adopt or reject ITEM does not seem to have happened at these business units at all. They simply wanted to give it a try, interested in the results it could bring. Only for general management did such a formal adoption take place, although at a later time (late '90s). PM introduced ITEM to general management. At this *knowledge stage*, the knowledge general management gained on ITEM could be, according to diffusion theory, typified as 'awareness-knowledge' (knowing that the innovation of ITEM existed) as apposed to 'how-to knowledge' (knowing how ITEM was to be used) and 'principle knowledge' (knowing what functioning principles support ITEM and how it actually works). After general management decided that ITEM was to be employed, 'how-to knowledge' was disseminated throughout the organisations to the people who had to work with it.

6.2.4 Attitudes and behaviour towards the adoption of ITEM

According to diffusion theory, after becoming aware of an innovation an individual can develop an attitude (feeling) towards it. This *persuasion stage* is understood as the formation of an attitude towards an innovation and a change in the (overt) behaviour of an individual. Persuasion in the diffusion theory is not necessarily meant as a change in a particular direction intended by some particular source, such as a change agent, but it is governed by characteristics of the innovation. By becoming aware of the innovation, the individual develops his/her own attitude towards it, which can either be favourable or unfavourable. A favourable attitude is likely to result in the adoption of the innovation, whereas an unfavourable one is likely to result in a rejection. However, the actuality of the situation was not as clear-cut as the diffusion theory leads us to believe. People developed mixed attitudes

towards ITEM, favourable to some ideas embedded in ITEM and unfavourable to others. We will elaborate on this phenomenon below.

According to the diffusion theory, the development of an attitude is informed by the perceived characteristics of the innovation. These are relative advantage, compatibility, complexity, trialability and observability. The *relative advantage* of ITEM as positioned by PM included the possibility to prioritise IT projects and investments, to give better quantitative insight into the financial impact of investments and to give more qualitative insight into costs, benefits and risks for investments. PM argued that it provided better control over the budget and IT resources, improved decision-making by rationalising it and made it more objective. Finally, they said it gave people the opportunity to assess outcomes of investments (IIC-PM 1997). Since general management felt the need for more insight, better control, cost reduction and better decision-making in IT investments, they seemed easily persuaded to adopt ITEM based on the promises it entailed. However, as seen in the *implementation stage*, the actual adoption did not proceed as was intended. To the dismay of PM, general management neglected the prioritisation proposed by ITEM, and on both occasions of decision-making used their own scoring techniques.

One manager of PM expressed his confusion regarding the actions of general management as follows: "General management actually negated everything because they thought all 50 projects were important and decided to allocate enough budget to execute them all. In essence, General management just dismissed the whole thing. Incredible! We told everyone that there was a limited budget and that we needed to prioritise. And what does general management do? They just grant extra budget! You shouldn't do that too often because people will start wondering why they spent time scoring all these projects, and why they even bothered to make proposals in the first place."

In the second prioritisation round, general management again ignored the prioritisation given by PM and ITEM. Moreover, the envisioned prioritisation through a scoring process by business managers, as was carried out in the first round, was abandoned due to budgetary constraints. PM notes: "The second time, we skipped the prioritising round with the managers since there was only enough budget

for the most urgent projects and current projects running. We made a list of all urgent projects, and gave that to general management. They responded by saying that things do not work that way. They took their pencils and went through the whole list, including the other (less urgent) projects. They prioritised all 80 projects themselves!"

The prioritisation general management used was not transparent to the rest of the organisation. Projects that were considered of paramount importance by information managers were neglected by general management. General management obviously had its own ideas about what was to be considered urgent or not. Some projects that PM had classified as 'not urgent' or 'to be declined' were considered by them to be mandatory for legislation or of paramount importance to IIC. General managers argued that they had a better perspective than PM on the broad spectrum of issues IIC was facing and the direction in which IIC was heading and therefore had made their own prioritisation.

With regard to *compatibility* of ITEM with existing needs, values and previous experiences, we see that the situation at hand was compatible with ITEM. The conditions expressed a problem of financial control of IT; ITEM was able to propose a solution to these problems and therefore seemed compatible with current needs. The *complexity* of ITEM is perceived differently by various individuals. PM, having full knowledge of the method, saw it as an easy-to-use tool. Though they realised that ITEM might require 'some exercise' (IIC-PM 1997), they were confident that people would quickly pick it up. However the business managers, the potential adopters of ITEM, had a different view. To use ITEM, they argued, much specialised knowledge about making business cases, assessing future costs, benefits and risks and making financial calculations is required. Rather than viewing ITEM as something that could be used by all, they saw it as requiring specialists. *Trialablity* of ITEM, the degree to which the innovation may be experimented with, is low. Though the method can be used selectively, only when all the investment proposals use the method are the results of ITEM visible. Moreover, the necessity for using ITEM for budget allocation at the end of the 90's left little room for experimentation. Finally, *observability,* the degree to which ITEM gives visible results, is moderate. Of course the overview of projects and their possible impact is something easily observable, but

decision-making being improved is hard to demonstrate. Rather, the observation that general management was not using the prioritised results demonstrates that ITEM did not have the intended beneficial results.

In the *decision* stage, a decision is reached on the basis of the attitude formed. Attitudes and behaviour were however not very consistent. As Rogers describes it (Rogers 1995): a favourable attitude towards an innovation does not necessarily lead to *adoption,* neither does it mean a guarantee for *action.* There may be many reasons why an individual, although having a favourable attitude towards an innovation, does not make the decision to adopt, or does not take the actions required for adoption. Such reasons, Rogers claims, include undesirable side effects caused by the (adoption of the) innovation, lack of resources or means to act or uncertainty about outcomes. In this case, this is visible by the fact that although general management formally decided to adopt ITEM, it was left unused. In many cases, this was due to the stress of the workload. Using ITEM had the undesirable side effect of taking quite some time and resources away from day-to-day operations. In addition, managers were more eager to get tangible results than fill out ITEM-reports. Moreover, general management neglected the results of the prioritisation proposed by ITEM in both cases it was used. So while being adopted in intention (words), an important part of ITEM can actually be regarded as rejected in practice.

Just as having a favourable attitude towards an innovation does not automatically result in adoption, neither does having an unfavourable attitude towards it automatically lead to rejection. Reasons for adopting the innovation given an unfavourable attitude involve pressures such as mandatory requirements, avoiding something more unfavourable (e.g. a kind of threat) or complying to some force (e.g. physical, military or market force). In the IIC case, the decision to use ITEM was clear and simple: favourable or unfavourable attitude, those departments that did not deliver ITEM-reports did not get budget for their projects. In the terms of the diffusion theory, it can be viewed as an authority innovation-decision: a decision driven by authority, rather than an optional ("individual") or collective ("group") decision to adopt.

6.2.5 Re-invention of ITEM

PM took on the role of change agent. By persuading general management that there was a need for ITEM and thereby securing its support, PM more or less pushed ITEM onto the organisation. "Plans without the ITEM-report do not get a budget" was the message. In addition, PM supported the adopters by organising training programs and offering help during the use of ITEM. Moreover, the information managers were used throughout the organisation as promoters of change. Although these tactics all seemed to lead to a successful *implementation* of ITEM, a phenomenon of re-invention, which can be related back to Rogers' work, took place during this process.

Rogers defines re-invention as "the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation" (Rogers 1995, p. 174). Re-invention expressed itself in the case of IIC through:

- users only partially completing an ITEM-report, for example leaving out the risk assessment;
- users making their own (favourable and/or partial) estimates of benefits and costs;
- users making their own (favourable) return-on-investment calculations – leading to the Finance Department having to make these calculations afterwards;
- adaptations made by PM during the implementation (changing criteria and other content of ITEM and skipping the scoring process in the second round);
- use of results: results were used (also) for other purposes than IT decision-making, e.g. for operational activities, such as planning and assigning IT capacity – and possibly in the future for *ex post* evaluation;
- the scoring process being replaced by a meeting and thereby trying (unsuccessfully) to come to agreement via discussion;
- general management neglecting the prioritisation proposed by ITEM, but using their 'own pencil' to scratch off proposals and suggest others for execution.

After ITEM had been used for the first time, PM asked an external audit team to perform a survey about the adoption of PCM, of which ITEM is a part. Such an

assessment can be regarded by the diffusion theory as part of a *confirmation* of the adoption. Results from that survey (IIC-PM 2000a) showed a less bright picture than what was written in PM's own evaluation, which concluded that "ITEM has proved to be very well applicable and of great value to the organisation. [...] The organisation has on many accounts become more critical and profound towards projects and project proposals. [...] The method has experienced broad acceptance in the organisation and is valued very highly." (IIC-PM 2000e). By contrast, the PCM survey shows that only a small part of the organisation is effectively using PCM, including ITEM.

Actually, ITEM fulfilled only a few of the promised benefits in terms of assisting justification, scoring, prioritisation and decision-making on IT projects. Moreover, as discussed above, ITEM was 're-invented' (i.e. had changed so much) so that "the original innovation may even have lost its identity" (Rogers 1995, p. 177). Suggestions were even made to change ITEM further. These included an *ex post* evaluation to verify *ex ante* evaluations and the introduction of a portfolio management group to handle the scoring and prioritising.

In this sense, the innovation was neither adopted nor rejected, but rather continues to be 're-invented' as to adopt it further (or a new version of it). In fact, almost all persons encountered in the research state that it "certainly is a step forward", though many claim "still a long route has to be progressed". In Rogers' view, maybe the confirmation stage has not yet been reached in our case.

6.2.6 The adoption of ITEM using the diffusion theory

In terms of a drawing a conclusion about the adoption of ITEM, the diffusion theory would suggest a failure, or at best a very limited success. Both the ITEM-reports and the Internal Rate of Return documents are criticised by most involved to lack quality, and are thereby not commonly considered as proper justification for the proposed investments. The scoring process was only carried out once and with very limited success. Though the process delivered scores, they were not used in the decision-making. The second time, people were unmotivated and due to lack of budget scoring did not take place at all. A substitute discussion by managers intended to

arrive at a consensus regarding the valuing of projects degenerated into a fierce debate. No agreement on the importance of the proposed projects was reached. Both times, the prioritised list of projects was neglected by general management in their decision-making process. They used their 'pencil' to prioritise the whole list of projects and finally reached a decision based on discussion with each other, rather than follow the advice given by ITEM. From the perspective of the diffusion theory, all these outcomes point to the failure of ITEM.

Though the ITEM-report had been applied, the additional ideas involved in ITEM (using it for justification, scoring, prioritisation and decision-making) were mainly lost in the process. Many respondents in the case argue that there still is a long way to go, supporting the view that they too agree that ITEM is far from being actually adopted. Some suggest further adaptations with regards to *ex post* evaluation so that prior estimates can be evaluated afterwards.

6.2.7 Discussion of diffusion theory

A large number of the factors suggested by diffusion theory for the adoption of IT evaluation methods (such as mentioned in section 3.3.4, in addition to all kinds of factors identified in earlier innovation-diffusion research) can be seen in the case description to play more or less important parts in the adoption of the evaluation method at IIC. For example, it was not until top management subscribed to applying ITEM that it actually was used; IIC, judging from its history with IT, can be classified as 'innovator' or 'early adopter' (Rogers 1995, p. 263), making it more open to IT related changes; and an economic climate of cost reduction can be seen to stimulate the adoption. The characteristics of ITEM (its relative advantage, compatibility, complexity, trialability and observability) might however be the cause of its limited adoption. Maybe PM was not a powerful enough change agent to influence others to adopt ITEM, or other (more powerful) change agents may have prevented adoption due to undesirable effects (Rogers 1995, p. 335).

Identifying and assessing all of these factors, so argues diffusion theory, can help to understand why ITEM failed to fulfil its promises. But already from the limited analysis given above, we see conflicting explanations for our case. Some factors would suggest success, others failure. More importantly however is that a number of

prominent observations cannot be explained by the diffusion theory. Most importantly, we see that the innovation is neither completely adopted nor rejected. Moreover, we see that re-invention plays a vital role in understanding the case. Not only do we see that ITEM is used in different ways than was intended (the traditional view of diffusion theory on re-invention where the artefact remains the same but is used for different purposes), but also that ITEM is shaped and altered along the way and 're-invented beyond recognition'.

This leads to the conclusion that the diffusion-theory analysis leaves many things unexplained and many questions unanswered:

- What actually gets adopted? The evaluation method that in the end gets adopted does not entail the results envisioned by its initial creators (e.g. PM). Moreover, the way the method is used ('irrational' and political) is in many ways contrary to what was envisioned (improved 'rationality'). But although the adoption can be said to be a failure, it changed the organisation in a profound way. Not only was ITEM used for different purposes than was intended (also see the next bullet point), it also changed dramatically. For example, the valuing of the different projects (the scoring) drifted from scoring to discussing (actually back to the prior situation, but now a discussion with ITEM-reports as input for discussion).

- Who has adopted the method? Saying that the organisation has adopted the method would not do justice to the observations of the case. Though everybody works with the ITEM-reports, who in the end really uses ITEM as it was intended? What about the justification, scoring, prioritising and decision-making ITEM was meant to improve? In constructing a justification of investment proposals, the method has been 're-invented'. It does not show the costs, benefits, urgency and risks, but only very partial views on some of these aspects. The scoring, prioritisation and decision-making also demonstrates a limited use of the true nature of ITEM. Has ITEM been 're-invented' so much so that we can still talk about the same innovation? Every actor seems to have re-invented it to his/her own interests, leading to different interpretations and uses (see section 6.2.5).

- In many ways, ITEM changed the organisation (rather than ITEM being diffused in an immutable organisation). For example, organisational work processes changed: people now had to construct reports and give scores in addition to their normal work processes; organisational functions changed: SPS managers suddenly were faced with making future predictions on projects; the responsibility of departments changed: ITEM moved PM to a position where it gained influence over the decision-making [26]. ITEM cannot be seen as the same tool that is now being used by the same organisation – roles changed, people changed, decision-making changed; the organisation changed. Innovation adoption does not seem to be a matter of 'fitting ITEM into the organisation'. Instead, the question becomes: in what way did ITEM change the organisation? Putting it differently: in what way did ITEM re-invent the organisation (rather than the other way around)?

- In more detail, if ITEM changed the decision-making, how did it change it? The case shows that ITEM changed the way of thinking about investment proposals. If it was used for communication, what did it communicate? What did ITEM 'tell'? Or, differently phrased: what kind of world did ITEM create?

- How was ITEM adopted? The stages of the diffusion theory seem hardly to fit in this case. For example, the 'innovation-decision' has not been made formally, and we see that actually every person (and as we will see in the next chapter, every non-human as well) involved makes his/her own decision. Moreover, there is a big difference between attitude and behaviour. Some people adopt the method in words but do not demonstrate this in their behaviour (see section 6.2.4).

- Why were the results that ITEM provided not followed by the decision makers? Using the ITEM-report does not simply seem to imply using the decision-making process ITEM proposes. What are the reasons for only

[26] This is demonstrated, for example, in a document by PM addressed to business managers stating: "Only those assignments which PM feels have met the requirements will be carried out by System Development" (IIC-PM 1999d, p. 3).

adopting part of the innovation given that the perceived characteristics of the innovation seem favourable?

The diffusion theory as expanded by some of its proponents provides only limited help in answering these questions (e.g. by the concept of re-invention, or arguing that the decision to adopt does not automatically lead to actual adoption). But surely, to understand the adoption of evaluation methods, these questions need to be addressed. We turn to the actor-network theory to attempt to answer the questions stated above. This perspective holds that it is not so much some static, given properties of the innovation (i.e. ITEM), or the individuals and the social network that determine its adoption. Rather, it is the emergent and changing properties of the adoption process, as well as the individuals and other *actors* in the network which in the end accounts for the resulting use of the innovation. One of the most fundamental ideas of ANT is that how actors (with their interests and inscriptions) form part of the heterogeneous network, and how the adoption of the innovation takes form, is very dependent on those surrounding actors.

6.2.8 Conclusion on diffusion theory

Diffusion theory proved to be a good initial candidate for the analysis of our case. It offered a language (e.g. with terms as diffusion, adoption, characteristics of the innovation, re-invention, influential factors in adoption, etc.) to think about the spread of ITEM. Moreover, it provided a structured approach to analyse our case in the stages of diffusion (knowledge, persuasion, decision, implementation, and confirmation). However, the analysis shows that these stages are not easily ascertained in practice. For instance, the decision to adopt is not as explicit as first thought. Sometimes it happens during the knowledge or persuasion stage, other times during implementation (i.e. due to an authority decision). In addition, the decision is constantly being challenged by different people.

Looking beyond the common criticisms of diffusion theory (discussed in section 4.2.4), we have seen that the notion of re-invention plays a crucial part in our case study. This includes the re-invention of the innovation itself as well as the unintended 're-invention' it causes within the organisation. The limited

understanding the diffusion theory presents on this phenomenon leaves many important questions unanswered.

In conclusion, diffusion theory offers a structured approach for understanding the spread of IT evaluation methods. Many of the influential elements of innovations and its environment, which have been uncovered in previous studies, have positively shaped the way this research could focus on relevant aspects in our case study. Such elements as described in section 3.3.4 have broadened our understanding of the issues in the case at hand. Without insights from the diffusion theory, some would most likely have been overlooked. Thus, it sensitised us to look for the influence of those aspects and then to look beyond them. The questions that appeared are addressed in the next section when we carry out another analysis of the case study based on the actor-network theory.

6.3 AN ANALYSIS USING ACTOR-NETWORK THEORY

6.3.1 Introduction

To address the difficulties that diffusion theory presented in the prior section in understanding our case study, we now employ ANT. In contrast to diffusion theory, ANT looks beyond the supposedly innate nature of an innovation and the specific characteristics of the change agents or society to a process of network formation and black-boxing. The process of introducing ITEM at IIC is a 'process of network formation in which all actors seek to persuade others to become their allies in promoting the acceptance of their own view of the way the problem can best be solved' (Tatnall 2000). In this process, the evaluation method itself is one of the prominent actors involved in shaping the network. It is a process of mutual translation, where actors in a dynamic negotiation and persuasion mutually define each other.

Drawing on empirical data from our case study, we will throughout this section suggest that ITEM can be perceived as an actor. We will start by defining PM's position since it is essential in understanding the analysis of the translation of ITEM. We continue the chapter by demonstrating that ITEM is a punctualised heterogeneous network, a black-box, with associations with other (social) actors; it is

a spokesperson for other (silent) actors; and it tries to (and partially succeeds to) translate other actors by establishing itself as a relationship between actors (Callon 1986a).

Actors are not defined by themselves but by the position they assume in the actor-network (Law 1992). ITEM is 'translated' to reach a position in the network. But which position does it assume? We will see in these subsequent two sections that it has become part of the network but not in the way PM (and ITEM's own inscriptions) had intended. We will focus on the process of translation and will start by outlining the process in which PM attempts to enrol ITEM at IIC. In this translation process we see "the continuity of the displacements and transformations" (Callon 1986a, p. 223); the continuous interplay between actors.

The translation is neither a complete success nor failure. We will discuss the translation and analyse why the resulting outcome is not the same as the intended outcome. Before we conclude our analysis of ANT, we explicitly demonstrate the 'actorness' of ITEM in a section that draws out the translations caused by ITEM.

6.3.2 The actor network before ITEM

Our story begins in 1996. After some close calls on major system failures (which would have been disastrous) and numerous small failures, IIC's management came to the conclusion that the legacy systems had to be renewed. To achieve this, they recruited someone from inside FGC who had a good track record with managing complex projects. The suggested project manager was asked to run two major projects to improve the situation. But before she started, she was given three months to acquaint herself with IIC to 'see how things work'. Within that time, the project manager came up with her own vision of what needed to be done. She noticed, due to her experience with another FGC company, the messiness of IT project management at IIC. Projects were stopping and running on an ad-hoc basis, there was lack of insight with regard to current IT projects and a lack of IT project management. She presented these problems to IIC's general management and convinced them that undertaking two complex legacy-renewal projects were doomed to fail if no proper project management could be introduced.

The demand for new products, problems with current legacy systems, plans for new information systems, the lack of IT project management and the arrival of the project manager from outside IIC, responsible for identifying the abovementioned problems, led to the creation of a new department, namely Program Management (PM).

PM was positioned as the solution to current problems (lack of management regarding IT projects) and future problems (by facilitating renewal of the legacy systems). In this process of translation (Callon and Law 1989) the interests of the suggested project manager, to strive for a successful implementation of the legacy-renewal projects, and the interests of general management, to solve current legacy problems and create new information systems, are connected by a common interest to develop Program Management that improves IT project management. Within the context of IT project management, PM became the spokesperson for general management; general management was mobilised through the creation of the new department. This translation can be termed 'problematisation' (Callon 1986a), where one actor convinces (potential) allies that it holds the answer to their common problem. Thus, PM was born.

6.3.3 ITEM as an actor

In this section we describe how ITEM can be seen as a (non-human, socially constructed) actor in the process of employment of IT evaluation. Drawing on the data of our case study, we discuss in this section the justification of considering a social construction as an actor, the coming into being of such an actor and ITEM as a spokesperson for other actors. In the remainder of this chapter we build on the notion of ITEM as an actor and strengthen such a perception. Such a view, it will be argued, gives a broader understanding of the phenomenon of evaluation method employment. ITEM is considered as a network element here, an actor that translates and gets translated in the actor-network.

A social construction as an actor

In the use of ANT in information systems research, one might think that something *technological* is required to justify the use of ANT. However, ITEM cannot be considered a technology, but rather something that involves certain techniques (e.g.

writing, calculating and scoring techniques). In this sub-section we address the issue of considering ITEM to be an actor in ANT, even though it is neither pure technology nor a physical artefact.

ANT seeks to dissolve the *a priori* distinction between the social and the technological. Social and technical elements should not be given any special explanatory status. To argue then that ITEM is not purely technical (nor purely social), and that ANT therefore is not appropriate for analysis, goes completely against the premises of ANT. ANT attempts impartiality towards all actors in consideration, whether technical or social, whether human or non-human, and makes no distinction in approach between the social, the natural, technological or any other *a priori* distinction between actors. They are to be analysed using the same vocabulary and the same register (Callon 1986a). This can also be seen for example in the case studying the domestication of scallops, analysed by Callon and Law (1989), where ANT is used in a setting where none of the identified actors is purely technological. In fact, the scallops are considered actors that refuse to be enrolled by the scientists who seek to domesticate them.

Though ITEM expresses itself in physical artefacts, such as the ITEM-report, the ITEM-instructions and the database to support prioritisation, in essence it is much broader. Its main purpose is justification and prioritisation and therefore includes scoring techniques, prescribed ways to perform assessments and particular views on decision-making. In the broadest sense, ITEM can be seen as a *social construction* involving a social process rather than a physical artefact. It can be viewed as "a human artefact which is drawn on and used to create or reinforce meaning by the interacting human participants involved" (Doolin 1998, p. 302). It forms part of an environment within which managers interact in order to develop shared meanings and interpretations of an ambiguous social reality which are a basis from which action is constructed (Doolin 1998).

One of the main premises of ANT is that the world is full of hybrid entities containing both human and non-human elements which are not easily separated when analysing phenomena. However, in most uses of ANT, non-human *elements* are equalled with physical and tangible matters (e.g. scallops - Callon 1986a; car park

access control system - Vidgen and McMaster 1996; transportation system - Latour 1996a). Some notable exceptions are work from McMaster, Vidgen *et al.* (1997), who consider the employment of a structured method as systems development methodology (SSADM), Hanseth and Monteiro (1997), viewing a communication standard in infrastructure (EDIFACT[27]) as an actor and Boland and Schultze (1995), discussing an accounting technique (activity-based costing). If it already seems like a radical move to grant artefacts the same explanatory status as human actors, since it seems to reduce human actors to mere objects (Walsham 1997), is it not even more radical to grant the same status to *social constructs* (i.e. to mental concepts about how to perform managerial or organisational processes)? To say that they have equal explanatory status in analysing a phenomenon does not however mean that they are equal, that is, 'have the same kind of intentions, feelings, ethics or interests' (Monteiro 1999). Or as Law argues, "to say that there is no fundamental difference between people and objects is an analytical stance, not an ethical position" (Law 1992).

Moreover, the critique that non-human actors cannot act themselves does not lead to the conclusion that human actors are therefore different (in analytical sense) from non-human actors, for both are heterogeneous networks (see section 4.3.2). For instance, a machine is also a "set of roles played by technical materials but also by such human components as operators, users and repair-persons. So, too, is a text. All of these are networks which participate in the social" (Law 1992).

Does ANT indeed require an actor to be either a human or non-human *artefact*? The answer to this question is undoubtedly negative. An actor itself is a folded actor-network, an association of heterogeneous elements themselves constituting a network so that each actor is also a simplified network (Law 1992). To make sense of complex phenomena, it is essential to simplify. Actors in ANT are constructed (Callon and Law 1989) to delimit the phenomena under analysis. "[T]he 'actor' of an

[27] "It is crucial to recognise that EDIFACT is not a self-contained piece of technology. It is a heterogeneous actor-network which includes: syntax for defining data structures; tools like converters and data bases for definitions of messages and message elements; a hierarchy of standardisation bodies on global, regional and national levels; prevailing conceptions and established practices for how to define and implement messages; an EDIFACT industry of vendors and consultants; artifacts like manuals, documentation and educational material about EDIFACT" (Hanseth and Monteiro 1997)

analysis is of the 'size' that the researcher chooses as most convenient relative to the direction of the analysis" (Monteiro 2000, p. 82, original quotes). Actors hence can denote elements such as organisations, scientific communities (Callon 1986a), methodologies (McMaster, Vidgen *et al.* 1997), professions (Monteiro 2000) and software standards (Walsham 1997).

ITEM can be regarded a heterogeneous network in which "bits and pieces from the social, the technical, the conceptual and the textual are fitted together" (Law 1992). It has a material form in the ITEM-report, its written instructions and the prioritisation database, but also is made up out of social and conceptual ideas on justification, scoring (and valuing), prioritisation and decision-making.

An actor coming to being: the black-box

The early start of the IT evaluation method (ITEM) can be traced back to 1997/1998 when PM introduced a 'project calendar'. The main purpose of the project calendar was to have an overview of the projects that were running and scheduled for that year. The results presented by the project calendar led to new insights, strengthening the need for an enhanced evaluation method (i.e. strengthening the problematisation). It paved the way for people to question the purposes of all these projects. An attempt by PM to link all of the projects to explicit business strategies failed due to difficulties in creating a consensus on business strategies. In ANT terms, they failed to translate the interests of the different departments at IIC into a common formulated business strategy to which they could relate the projects on the project calendar.

Instead, PM developed a basic project template (the PCT) which could be used to capture some of the characteristics of each project (name, date, purpose, etc.). This evolved through further research on concepts such as Information Economics (Parker, Benson *et al.* 1988) and Balanced Scorecard (Kaplan and Norton 1992) by PM into the ITEM-report. The document thus packs different ideas on evaluation (i.e. it is inscribed by different backgrounds and discourses). The financial background provided the need for basic financial costs and benefits, including financial return ratios (e.g. the Internal Rate of Return calculation); the IT evaluation methods in the literature, such as Information Economics and Balanced Scorecard,

provided criteria for assessing qualitative and intangible costs, benefits and risks; and lastly the ideas of PM about decision-making, being able to judge and prioritise (including scoring techniques) proposals were inscribed in the method (e.g. visible in the documents on how this scoring should take place - IIC-PM 2000d). PM intended the method to give a comparable representation of projects on the basis of which decisions could be made as objectively as possible about the approval of projects. This demonstrates a discourse of rational decision-making (see section 3.4.5).

All these ideas were embedded into ITEM. PM succeeded in simplifying the complexity behind ITEM and *making it the obvious* and natural way to handle IT project proposals – thereby actually making it an *actor* (Monteiro 2000 – see section 4.3.2). Thus, ITEM has black-boxed (Vidgen and McMaster 1996) the interests of several actors, including the Finance Department (financial justification), other IT evaluation methods (IT Economics and Balanced Scorecard with their embedded ideas on how to value information and prioritise projects) and the PM department (inclined towards a form of 'rational decision-making'). In other words, ITEM conceals all kinds of notions stemming from different actors, and presents itself as a straightforward method (a black-box), that other actors can take for granted. Moreover, ITEM was inscribed in later years with the focal points of the 'business strategy' (see section 5.4.5). Each proposal was required to state explicitly to which of the focal points it contributed. By embedding the business strategy, as formulated by general management, ITEM sought to mobilise general management. However, as we shall see below, the case shows that ITEM did not black-box general management, since they too had their own interests apart from the business strategy (see section 6.3.5 below).

Inside the ITEM black-box, we find some tangible components in which the above were inscribed: ITEM-reports, Internal Rate of Return documents and instructions on how to legitimise, score and prioritise and a database for statistical analysis.

ITEM consists of a network of complex associations in which different network elements have been drawn together. According to Law (1992) such a network can be 'punctualised' and considered in the form of a single actor. But although these different components may be seen by PM as being black-boxed in ITEM, we shall

see in the further analysis that 'these components have become painfully visible' (Vidgen and McMaster 1996) during the employment of ITEM. They become visible in the sense that only part of what is considered to be the actor ITEM is enrolled. "Note that the heterogeneous engineer cannot be certain that any [components] will work as predicted. Punctualisation is always precarious, it faces resistance, and may degenerate into a failing network" (Law 1992). Moreover, an actor is not only a punctualised heterogeneous network, a black-box, but also becomes an actor in its association with other actors – in its participation in the social.

ITEM as a spokesperson for others – a faithful representative?

In a way, ITEM can be seen to become a spokesperson for the investment project proposals (in their turn being black-boxed ideas, intentions, actions, beliefs and experiences of a business unit or department). In a translation between ITEM and the proposals, ITEM will represent the proposals in the further decision-making process. This raises the question as to whether or not ITEM is a faithful representative for these proposals.

A critical perspective shows that in its representation ITEM does not capture an independent reality, as was initially envisioned by PM, but rather it can be seen to *create reality* (Power and Laughlin 1992). It is not what an evaluation process says, but rather what it allows to be said that makes the difference (Smithson and Tsiavos 2003). By choosing an evaluation process that emphasises financial elements, other elements, such as social ones (e.g. the quality of the work experience, a consideration for the impact for people and their working environment – Garrity and Sanders 1998), may lack representation. In other words, ITEM is inscribed with a distinct pattern of use derived from different actors (i.e. Finance Department, PM and evaluation concepts), as described in the previous section.

As argued above, this inscription can be seen to be informed by a rational discourse in which the world is reduced to a series of numbers or some kind of classification so that it can be compared and managed. The evaluation concepts used to inscribe ITEM are inherently linked to instrumentalist and functional assumptions (see section 3.2.5) in their aim for (technical) control. Through their perspective, ITEM is inscribed with the notion that evaluation is to be a formal-rational process. The

assumptions associated with the instrumental and functional reasoning view (i.e. suggesting that projects and evaluations contribute to particular ends, objectively articulated and shared), however, have consequences that are likely to prove dysfunctional, as Symons (1994) convincingly demonstrates. In reality, ends are not agreed upon: they are controversial and the subject of considerable disagreement and debate. In our case study, PM experienced this when they initially tried to link IT projects to a list of organisational goals. From a critical perspective, pre-specified ends can be said to benefit certain actors at the expense of others. Evaluation methods thus are far from, what is usually believed in a rational discourse, neutral instruments that give objective insight into costs and benefits (Nijland 2001).

In a way, the employment of ITEM resembles the change described by Boland and Schultze (1995) from traditional accounting techniques to a new activity-based costing technique. The same warning Boland and Schultze give can be issued here. By including in ITEM a broader branch of issues to consider (e.g. to extend financial analysis with a formal analysis of all costs and benefits, including intangible benefits and risks) than was done previously, it has the appearance of giving a more faithful representation of what is 'out there'. However, ITEM is still only a simplification that in further cutting the edges of the representation fails to recognise the narratives underlying the investment proposals. One might even argue that previous ways to estimate costs and benefits of IT investments may appear simple, "but by not pushing too far to sharpen the outlines of [the investment proposal, they] allow a space for the complexity of interrelations in mental work" (Boland and Schultze 1995, p. 322). Or as Smithson and Tsiavos (2003) argue, although evaluation can be seen as simplifying representation, at the end of the day managers still have to deal with the full complexity of the investment.

Thus, we can conclude that ITEM can be seen to be an actor in the role of a spokesperson for other actors, though its faithfulness to the representative can be questioned. In the case study, the anecdotal story from the SPS manager trying to quantify the benefits of the timesavings of a specialist illustrates this point. Actual benefits of an investment proposal did not fit in the representation of ITEM, and a workaround had to be invented (see section 5.4.6). The final representation of the proposal in the ITEM-report differs widely from the actual proposal.

6.3.4 Employing ITEM – a successful translation?

In a first attempt to get ITEM enrolled into business operations, PM associated ITEM with the standard way of project management: the Project Control Method (PCM). But PCM had its own problems with enrolment; it was found to be too technical in nature to be accepted in business.

In a new attempt to enrol ITEM, PM tried to ally themselves with general management. In the light of changes in the organisational context, PM pleaded with general management to support the use of ITEM by managers. General management supposedly was enrolled to support this based on several arguments: the need for cost reduction (by organisational context, FGC and by general management directors, who when informed about IT costs, wanted cost reduction), the need to cope with the strain placed on IT capacity (by organisational context, with issues such as the millennium, euro-currency and a tight IT labour market) and the organisational restructuring in which business units now had to share (and compete for) IT resources which formerly had been allocated to them. However, in daily practice both business managers as general managers neglected ITEM on numerous occasions. With the pressures of time and money, they often considered ITEM a waste of time and resources. Moreover, their main interest was to get good results for their area of business – when a good opportunity came up, the main attitude was to grasp it as soon as possible and not incur delay by first writing ITEM-reports and then wait for approval.

As a result, ITEM-reports were only seldom constructed the way they were intended. To get ITEM accepted, a stronger form of enrolment was needed. By appealing to the clear constraint of IT budget and resources in the year 2000, PM convinced general management to support a stricter use of ITEM. By enrolling this strong ally, PM had the opportunity to take on the role of decision maker – judging which project proposals were to receive budget and which did not. PM positioned itself thus as obligatory passage point. The strong message it sent out to the business was clear: If projects have not been turned in properly (with proper ITEM-reports), they do not get approved. Projects that are not approved will not show up on the project calendar and therefore will not get any IT resources. PM allied with SD to hold firmly to this latter fact.

"SD is no longer accepting straight orders to make changes to the systems, but they will use the project calendar to see if the project has been approved. People now saw that 'it really was serious'. They often are faced with things that are said to be relevant, but it blows over. Now most people realise that this is here to stay", one PM manager illustrates.

Another helpful *interessment device* (Callon 1986a) to persuade business managers was the information manager. From their background (such as financially controlling IT, compatible with visions enfolded in ITEM) and their position of being responsible for IT in the business, they persuaded business managers to leave behind their old ways of constructing proposals and follow this new one. One information manager says: "We created an enormous push. We said that it was necessary! [...] We had to convince all of them." PM acknowledges the help it got from the information managers, stating that "if we did not have them, I do not know if we could have pulled it off".

By this time, it seems that PM had successfully enrolled ITEM in the organisation. In the process of network formation, PM persuaded others to become their ally in their view and solution to the problem (Tatnall 2000). In this enrolment, business managers changed their work processes to write ITEM-reports. By now "ITEM-reports are an established notion. Business managers now tell each other: we first have to draft an ITEM-report". Whereas people were used to explaining their project informally via a memo, now they had to think through costs, benefits and risks and shape them into the format ITEM provided.

Moreover, ITEM had positioned itself to become the spokesperson for the IT investment proposals. ITEM-reports were filled in for most investment proposals. And though they might not have the quality as envisioned by PM, the reports were filled in according to the format used for prioritisation. The financial details (such as the Internal Rate of Return) were calculated by the Finance Department and (at least in the first prioritisation round) were used for scoring and filling the database.

Having a clear list of all investment proposals, including a description of what each entailed, ITEM can also be seen to feed the decision-making process in which

general management allocates budget. With the clear overview of proposals, they no longer have to rely on their own knowledge of projects. It gives a basis for considering the whole of IIC rather than only their own part.

A SPS manager notes that at IIC "we used to have the 'beep' system with regard to getting project proposals approved. Those who beeped the loudest got their proposals approved. Today this is different." The structured approach of ITEM gives voice to otherwise unheard proposals. However, one might argue that ITEM is just another beeping game with a different beep, since the way projects display themselves with ITEM as a spokesperson is not as objective as one might think. Some proposals, by highlighting certain benefits and downplaying particular costs and risks, still might sound or be voiced louder than others.

In sum, ITEM can be seen to be *mobilised* (Callon and Law 1989) since participants drew upon the information, rules and resources embodied in ITEM in their daily activity. In doing so, they reproduce and reaffirm its importance, form and content (Bloomfield, Coombs *et al.* 1994). In other words, end-users by themselves ask for ITEM-reports to be filled in, accept that it is part of the job, that SD will use the 'project calendar' to determine if resources are to be allocated to a project and general management look to PM to give them advice on project proposals. In addition, we see in the process described that the method enforces itself – insight into costs of IT strengthen the demand for more control and hereby the demand for using ITEM.

At the beginning of the translation, IT investment proposals, business managers, general management and PM were separate. After translation, ITEM had linked them together and "brought them in relationship with one another in an intelligible manner" (Callon 1986a, p. 223), thereby creating an actor-network tuned to perform formal IT evaluations. Through the creation and strengthening of network associations, ITEM acquires the features of a black-box. That is, it becomes hard fact (Vidgen and McMaster 1996).

6.3.5 Employing ITEM – a failed translation?

But, as we shall see in this section, the ITEM-report was providing results that differed from the outcomes PM had intended. The inscriptions proved to be too weak to produce the results PM preferred. Moreover, on closer examination, only part of ITEM could be seen to be employed. The ITEM-report can be seen to have become enrolled, while the actual decision-making process, envisioned by PM and strongly tied to ITEM, failed to be enrolled. The black-box ITEM was deconstructed (Vidgen and McMaster 1996), so to speak, and only some of its components had been enrolled. Having people use the format of ITEM was one thing; having them comply with the other elements of ITEM was another. In other words, besides the results ITEM produced, the use of ITEM did not resemble its intended use as envisioned by PM. We will discuss subsequently four parts ITEM entailed: justification, scoring, prioritising and decision-making.

Justification

By the middle of 2000, the documents that ITEM provided were used throughout IIC. PM was of the opinion however that the documents were 'below standard'. Cost and benefit estimates were unrealistically positive, financial ratios were not properly calculated (e.g. proposals use different interest rates and thereby become incomparable), in a large number of cases risks were qualified as 'not appropriate for this project' and many projects were classified as 'strategic' or 'must-do', having been put under the label 'millennium-project' (the Y2K-problem). In addition, some managers noted high rising maintenance costs by some departments (as opposed to lowering project budgets), thereby insinuating that some projects were evading ITEM by qualifying themselves as maintenance costs (which do not require an ITEM-report and almost automatically get budget). Such expressions of politics in IT evaluation are very common (Nijland, Berghout *et al.* 2002).

"The last years we saw maintenance costs growing and growing. People started thinking that if they did not get a budget to carry out their projects, then they would list the required system changes under the budget for maintenance. By broadening the scope of maintenance, things became visible. For example, goals stated officially on paper did not match the results people intended to achieve. It was a kind of shortcut for managers, enabling them to carry out some projects that were crucial in

their view", one manager contends. Another manager notes ironically that "if you add all the savings predicted by the ITEM-reports from a year back, half the company would have disappeared by now. But if you now look a year later, you see that more people have joined."

Some managers confess that some costs and benefits maybe somewhat more positive than realistic. Superficial analysis of this behaviour would qualify it as political behaviour designed only to serve the self-interests of individuals. Politics in decision-making is often seen as disruptive and as something that should be suppressed. They are regarded as disrupting the 'rational model' which is deeply rooted within Western society (Morgan 1986). The comments made by some PM managers on these expressions of politics demonstrate a similar viewpoint and show the rational discourse. The politics are blamed for the low quality of ITEM-reports, thereby failing to be a proper justification for the project. On the intranet of IIC, the page concerning ITEM states that the "improper use and hiding behind these procedures and methods should be prevented and where observed, be corrected" (IIC intranet, June 2001).

However, quite a different view comes from one of the market directors. He argues: "Self-interest is the source for new initiatives. If everybody had the same interest, nothing would happen! Moreover, self-interests often are not just solely linked to the individual interests, but to the role one plays in the organisation, the function you have." Being committed to those interests serves the interests of the organisation. Thus, such politics are very healthy and taking them out of the organisation would be disastrous, he argues. Rather than marking a (too) positive view on project proposals as a 'bad thing', he sees it as a sign of support and motivation for the project. Such support is crucial to the success of any project. The director argues that when people are enthusiastic about an idea, who can blame them for not seeing all its negative sides? Such behaviour can thus be explained as a form of "bounded rationality" (or cognitive dissonance), where people who are excited about a project see the positive sides more than the negative ones. Political actions can then be understood, in contrast to personal interest, as being committed to the interest of the department, business unit or even IIC as a whole.

Farbey, Land *et al.* (1993) noticed the same paradox: on the one hand you need a project champion to lead the project enthusiastically, on the other hand you do not want him to 'cheat' to get the 'go ahead' for a project. "If we praise the champion we diminish evaluation; if we promote the proper role of evaluation, we marginalize the champion" (ibid, p. 154). Brunsson (1985) speaks of *action rationality*, which was discussed in section 3.4.5. Organisations that have to solve both the problem of choosing the right thing to do and then get it done in practice are better served by such an organisational action perspective. Organisational action can be understood on the basis of three interrelated concepts: motivation, expectation and commitment. Actors should believe in the considered action to be a 'good' one; they should expect it to be carried out by the organisation; and they should commit themselves to it. Brunsson argues that "effective decision processes break all the rules of rational decision-making; few alternatives should be analysed, only the positive consequences of the chosen actions should be considered, and objectives should not be formulated in advance." (ibid, p. 22). The action rationality reduces rather than increases uncertainty and conflict between the decision-makers and thus leads to higher motivation, expectation and commitment. It leads not only to choice but also to action.

The wish to suppress these political expressions can explain PM's decision to let the department of Finance calculate the financial ratios and financially judge the project proposals from a certain point in time. One manager of PM illustrates: "We decided to calculate the Internal Rate of Return ourselves, rather than let the people do it. Because if the people do it themselves, they change the different rates of interest. We have seen proposals that adjusted the profit margin from the standard 5% to 10%. Our financial controller said: 'What's this crap? I have worked for 20 years at IIC and have never seen a margin of 10%! That is impossible!' But still the project leader simply puts his signature under the proposal!"

Another idea from PM to come to better justification in ITEM-reports was to introduce *ex post* evaluation and hold people personally responsible for the estimations in the project proposals. As Farbey, Land *et al.* (1993) state: "It is sometimes said on current affairs programmes that the reason criminals continue to commit crimes is the small probability of being found out. The same could also be

true of evaluation: the reasons people cheat on evaluation is that they won't be found out. [...] Organisations have no procedures by which unachieved or exaggerated benefits, or suppressed or underestimated costs, can ever see the light of day." (ibid, p. 155).

From an ANT perspective, these actions can be seen as strengthening the inscriptions in ITEM in order to persuade other actors to follow more closely the interests of ITEM. However, some managers express doubts as to whether these inscriptions would be strong enough. A business director argues: "If done correctly, *ex post* evaluation will not change much. It will influence all project proposals and all expected benefits will fall, since we all are guilty of making (too) positive estimates – I know how the game works. So everything is brought down to a more realistic level, but the list of priorities does not change. The same list of projects will be carried out."

Using ITEM however for *ex post* evaluation would mean another translation from aiding decision-making to a tool for accountability. Some people would call that misuse of the method. As one of the information managers noted, ITEM-reports should determine a strategic direction for IIC and be used less for operational management. He argued that the quantitative results it yields may not be misused for these purposes. Using ITEM for such purposes will diminish insight into strategic direction, since such a direction will lead to less quantitative results. People would fall back to more qualitative assessments, thereby potentially giving less information that could be beneficial to the decision-making process.

Another reason why the proposals were 'below standard' was that the end-users found the report very difficult to work with. It required people that were suited to ITEM – that could look beyond the current and specific problems and have an eye for broader and future issues. The case shows that not all SPS managers were able to do that. Moreover, most of the time specialised employees were needed to provide input for the proposal. These were people already involved in a large number of things, and writing ITEM-reports had a low priority since their job was also to keep 'business running' on a day-to-day basis. In addition, particular benefits that were considered important to the managers did not fit in the ITEM-report and workarounds had to be found. For example, time savings that could not be regarded

as financial benefits were appropriated into increases in the professionalism of employees. In this way, they made the proposal fit. It is however doubtful if such proposals were faithfully represented by ITEM once they entered the scoring and prioritising round.

Motivation for end-users to fill-in ITEM-reports proved to be low, something which had its impact on the quality. Especially in the second prioritisation round, people were unmotivated to write complete ITEM-reports again. Having had the experience that in the end general management still made decisions by relying on their own (covert) ideas about the project, they did not want to go to the trouble of writing a proper ITEM-report. Moreover, end-users complained about the amount of time they had to wait to hear if their projects would be approved, and if they were rejected, they did not receive any reasons as to why. This was also de-motivating. In addition, in the second round, knowing that only very few projects would be approved due to limited budgets, people did not want to make the effort to work out ideas fully, ideas that most likely would not be approved anyway.

By looking at the observations together, we conclude the following. In the attempt to come to a proper justification of proposals by enrolling business managers in ITEM, a negotiation took place about how ITEM-reports were to be constructed. The weak inscriptions of the ITEM-report left enough room for interpretation and enactment so that ITEM-reports could be constructed contrary to their intended construction. The story of an SPS manager artificially finding categories to demonstrate the benefits of the project is an example. ITEM-reports, as was the experience in other studies (Farbey, Land *et al.* 1999b), may exaggerate benefits or may distort or hide features of the project that might endanger the approval of the project. This could be seen as an act of improvisation (Weick 1993; Orlikowski 1996), where "procedures and instructions [are] not followed blindly, but regarded as an input, not always reliable, to get the job done" (Ciborra 1999, p. 145). In other words, the interessement and enrolment of proposals by ITEM seemed to be a failure due to the interessement of proposals by business managers – their proposals were allied too strongly with business managers who translated the proposal / ITEM-report not as an 'objective representation of the expected results' but more as a 'means to get budget', or as a 'time-consuming activity that needed to be done'. Surprisingly, however, the ITEM-

report was enrolled under these circumstances so that the competitive definition given by business managers could also be sustained. ITEM was used, but not in the way intended. It was made to fit both purposes.

Scoring and prioritising

It was not only that the delivered reports did not meet PM's expectations, but also the way in which these reports were subsequently used in the scoring, prioritising and decision-making that was quite different than PM had intended.

ITEM did not actually live up to the expectation of providing those who employed it with a neat and objective method of valuing the proposals (as described in IIC-PM 2000c), but shows failures in this area both times the process was carried out. Although the scoring technique was employed in the first attempt, the results were discarded in the subsequent decision-making round. The second time the technique was abandoned straightaway. A fierce discussion, which failed to lead to decisions regarding advice about prioritisation to the board, was the result. The unsatisfying outcome of the discussion can be attributed to the conflicting interests of the directors. Each of the directors was arguing for their own interests and there was no one party that could unite the others based on common interests. One director explains that "reaching decisions is of course more than objective weighing. It is also your own patch, your own business, your own interests – that is all part of it. That's just the way it goes. If there is no party that acts as catalyst in that process, then nothing happens. I can guarantee that because nobody will hand in their projects spontaneously." This was intensified by the dynamic context of the IIC business units of IIC after 1998 (see section 5.3.2). People still had to 'defend' their newly acquired position within the matrix organisation.

As a result, ITEM was translated by general management, business management and PM. The scoring technique was replaced by a prioritisation platform. It was no longer the case that a mechanical technique was used to formulate advice for general management, but a group of various actors, informed by ITEM, made up the list. In this process, PM was also translated. It received a catalysing role which replaced its role of administrator or bookkeeper.

Decision-making

General management welcomed the ITEM-report, but the analysis and advised prioritisation were discarded; the 'old' way of prioritising (by discussion, rather than being guided by statistical analysis) prevailed. The database with statistical analysis was designed to be a spokesperson for the ITEM-reports but was never mobilised. General management still made decisions based on what they knew about a project, how they felt about it and what their entrepreneurial instinct told them to do. This too can be seen as improvisation, where "there is much more intuition, instinct, and background experience even in carefully planned actions than meets the eye when analysing rational decision-making" (Ciborra 1999, p. 145). The decision-making process can be seen to be a negotiation process (see section 3.2.6).

This behaviour surprises some managers. PM commented: "That is the 'nice' thing that happens when you come up with a list of projects, which was constructed by using a neutral and objective tool; because then discussions start. Then individual directors say: 'But my projects falls just below the line!'" One information manager demonstrates his expected behaviour of general management. He tells that "We have tried to work with a prioritising system, on the basis of all kinds of criteria per project. But general managers then say: 'Huh, what is coming up at the top of the list now?' They should actually say: let us have another look at the criteria, but they do not. They say: the outcome does not please us, so we just rearrange some of the projects. That is a strange mechanism, but also very human. They should actually first rank the criteria, then rank the projects and then say: as manager I will follow the results. But ok, of course I am no general manager."

General management gives another view. They argue that they see all proposed projects as being valuable. But they need and want to take responsibility for the decisions they make. When you drop projects, 'it hurts,' so argued one manager. He states: "Of course it hurts! It would be strange if you would go through the whole process and someone would say [when his project was declined] 'Oh well, I don't mind'. If that was the case, then the wrong things were proposed. It is always that these things hurt; they have to hurt. And in the end it is always agreed that it is a shame that not all proposals could be granted. If not, the preliminary work was not carried out properly."

Some argue that too much attention might be given to the evaluation method in decision-making, arguing that general management do not make decisions solely based on ITEM-reports.

Moreover, stemming from the culture at IIC, general management consisted mostly of people with a wide background and range of experience in insurances at IIC. They had their own ideas about the prioritisation. Some questioned the use of ITEM-reports, stating that it "If it already is clear that a project is important, why do I have to read an ITEM-report to tell me that?" And although general management initially seemed inclined to use ITEM-reports for prioritisation, when new problems arose, they easily abandoned it and changed prioritisations of projects without the use of ITEM. A statement by an information manager illustrates the importance of this culture at IIC: "We have general managers that in the old days wrote their own insurance policies. They say: 'What does an information manager know about the urgency of a system? I have been at IIC over 25 years, I know better.'"

Thus, the method can be seen as one of many inputs. It does not make decisions (though it shapes them through ITEM-reports), but is added to the other motives, including background experience, covert motives, intuition and instinct. Farbey, Land *et al.* (1993) found that projects that are justified with a formal evaluation method can use the method 'for real' or for 'rationalisation', meaning that the formal decision was already made on other grounds. In the latter case, the method was used to substantiate the decision. That this does not always lead to the best solutions is illustrated by the story of an information manager at IIC. He said: "Last year I had a discussion with my boss. We had to exchange our systems for healthcare because they had become too old. My boss said he knew which system we should implement because a colleague of his at another insurance company told him how much cost reduction it could deliver.' I first had to convince him to do a preliminary study to see if the suggested system would also fit our situation. In the end, the system was the last on the list of analysed systems."

6.3.6 Translations by ITEM

Although the resulted outcomes of the translation process differ from the preferred outcomes by PM, the case demonstrates that ITEM does have an influential impact on the organisation in terms of translation. One major impact of ITEM is the way it translates different actors to other positions in the network. Illustrative is the document describing the process by which ITEM has to be carried out. It states that in this process "different persons have different functions and responsibilities" (IIC-PM 2000e, p. 12). ITEM, allying with PM, redefined responsibilities and roles. In practice, however, this achieved only varying degrees of success. In the process of ITEM employment, several translations are attempted: translations of the roles of Program Management (from project administrator to decision-aiding), business directors (from sole decision makers to shared decision-making), general management (from decision-constructing to decision-making based on the worldview of IT evaluation method), software development (from influential actor on decision-making to an efficient software factory) and general decision-making in IIC (from 'irrational' to 'rational' decision-making).

Translation of PM

The PM department was set up to manage IT projects. It started out as project administrator, listing the projects that were executed. From there on, PM took on the role of gathering project proposals. Being the actor that is strongly allied with ITEM, it eventually assumed the role of decision-aiding, and even the role of decision-making (by becoming the department that prepared list of the prioritised projects). It had become an obligatory passage point (Callon 1986a) through which investment proposals had to pass to get budget. Thus, ITEM helped to shift the role of PM, which at the beginning had no voice, to become an obligatory passage point. ITEM translated PM from administrator to decision-influencer, since the ITEM-reports were gathered and prioritised by PM. In the first round of the use of ITEM, PM enlisted business managers to help in prioritising; however it influenced this process by prescribing the way the prioritisation should take place (IIC-PM 2000d). In the second round, when business managers failed to make a priority, PM took over this role and made their own prioritisation. General management was not enrolled in this translation, since in both previous encounters they took the liberty to re-prioritise the projects again themselves, neglecting ITEM and its procedures. ITEM did however

translate PM into a substantial role in collecting, ordering and arranging IT project proposals. At the time of the research, the output is being used in the Portfolio Management Group as a basis on which they prioritise the proposals. PM has ended up in the role of catalyst in this prioritisation process.

Translation of business directors

Business directors in the past were used to judging projects based on their own knowledge of the project proposals; their own gut-feeling so to speak. With the introduction of ITEM, this no longer could be the case. ITEM translated them into decision-makers who had to make use of the ITEM-reports and make a decisions based on the information that was provided to them. The manual to draft ITEM-reports impresses on the reader that 'in formulating the text describing your project you should take into account that it should be clear to [managers in the scoring group] who are absolutely unfamiliar with the project (proposal)' (IIC-PM 2000f, p. 1). With the changing of the previous product-focused organisation towards a matrix organisation (see section 5.3.2), the business directors enrolled ITEM as the 'objective way' to prioritise – a necessity because it is impossible to know all the IIC projects by heart. Although they did initially enrol the ITEM-reports (albeit just one of the inputs), they did not follow ITEM's procedures. The second prioritisation round proved to be a failure – the translation of shared decision-making by ITEM (by scoring all the projects) was not enrolled. Currently, after the disappointing results from the second round, business directors undertake the prioritisation by discussing proposals – having abandoned the scoring techniques ITEM proposed.

Translation of general management

ITEM, allied with PM, attempted to translate general management into accepting the decision-making it provided. This failed. General management, in both cases ITEM was used, took their pencil to make their own prioritisation. The statistical analyses were cast aside. However, general management did make use of the ITEM-reports and the way it represented investment proposals.

Translation of software development

Whereas the department of System Development in the past used to be at the basis of ad-hoc deciding which projects were manned, ITEM by allying with PM, translated

them into efficient software developers rather than decision-makers. They were enrolled by ITEM because of the problems they had in prioritising. Everybody was demanding IT capacity, but they had no means to allocate their resources properly. In the past, resources were given to the people who 'shouted the loudest'. Now ITEM took care of prioritisation, giving SD the mandate to focus on what they do best: develop systems.

Translation of decision-making

ITEM also translated the vision of decision-making: from a personal to a shared decision-making. It even tried to translate the discourse from decision-making – from 'irrational decision-making' (based on instinct, gut feeling, personal attitudes, etc.) to 'rational decision-making' (based on shared goals and shared solutions, calculation and neutral information). As seen in the translation of business directors and general management, this failed. Though ITEM is inscribed with ways to 'rationalise' decision-making, practise shows that managers do not just copy the outcomes of the ITEM scoring or prioritisation. However, most respondents agree that ITEM does help in a process to come to a shared agreement (or at least one that is justifiable and explainable to others) of prioritisation. It provides a means to legitimise decisions. Former explanations as "general management just decided that your project was not important enough" were translated into explanations such as "Careful analysis and comparison of all projects lead to the decision that other projects currently have priority over yours".

In sum, we see ITEM carried out with it its own preferred behaviour and roles of surrounding actors. The degree to which it succeeded in establishing this behaviour in the actor-network is, however, limited. It imputes others "with interests, projects, desires, strategies, reflexes, afterthoughts" (Latour 1991), but also is imputed itself (as was demonstrated in the previous section). In other words, it translates, but at the same time is translated itself. Both directions of translation have mixed (i.e. stronger and lesser) effects. But that it had an important effect is indisputable.

6.3.7 Conclusion on actor-network theory

In sum, we conclude the following on our analysis using actor-network theory. Through the years, PM problematised the lack of program management to the lack of

insight into which projects were running, and beyond that, to a lack of insight into what kind of projects were running. Eventually, by enrolling ITEM, PM became the obligatory passage point through which IT investment proposals had to pass if they were to gain approval. Through this successive translation, PM and ITEM were increasingly mobilised. PM enrolled ITEM, which can be considered an actor in its own right. The method translated Program Management (from project administrator to decision-aiding), business directors (from sole decision-makers to shared decision-making), general management (from decision-constructing to decision-making based on worldview of IT evaluation method), and the department of software development (from influential actor on decision-making to an efficient software factory).

As an alternative to the diffusion model, the perspective of ANT offers an approach to explaining innovation that does not rely on any supposedly innate nature of the innovation, or specific characteristics of the change agents or society, but rather on a *process of network formation* in which all actors seek to persuade others to become their allies in promoting the acceptance of their own view of the way a 'problem' can best be solved (Tatnall 2000).

ITEM ended up being part of a translation, though not the translation initially preferred by PM. Only part of the black-box ITEM was enrolled. While being enrolled, it acted in quite a different way than was intended. The actors enacted ITEM to suit their needs but in ways that contradicted the (rational) inscriptions of ITEM. The different interests of the actors at IIC shaped the employment of ITEM – the obtained results were quite different from the intended results as initially envisioned by PM; both visible in the produced ITEM-report and in the decision-making process it was supposed to support.

The above demonstrates that different actors surrounding ITEM can be seen to have quite different interests, shaping ITEM and its format. Accepting that all actors have multiple interests, we highlight here some that are most influential in shaping the actor-network. We discuss the interests of PM, general management, business managers and investment proposals.

In its search for more *control* over IT management, PM is interested in becoming the defender of rational decision-making in IT investment decisions, employing ITEM as an aid. In PM's view, more control entails investment proposals that are quantitatively and financially supported, that can be compared objectively (statistically) and assessed in an *ex post* evaluation. Its interest therefore is to have all business managers employ ITEM in its prescribed way.

General management are concerned with the future of IIC. In times of uncertainty, they seek to make the investment decisions that are necessary to keep IIC a successful company. To make decisions, they rely on information gathered by PM (using ITEM) but also on their ('irrational') entrepreneurial insights and background experience. In the division of the company in different areas of products, different general managers are responsible for different areas of business. Apart from the success of the company as a whole, each of them seeks to make their own area flourish.

Business managers have a similar attitude. Their interest is to be able to make the investment required to develop and expand their specific areas of business. In addition, they are responsible for day-to-day operations and thus face the balancing of long-term versus short-term focused decisions. In the long term, they are interested in getting budget for new investments (by employing investment proposals), and they are required to develop ITEM-reports. By contrast, in the short term, their interest is to keep business operational. Investment proposals need to get funding so that the ideas, plans and opportunities identified can be pursued.

In conclusion, ITEM impacted the way of thinking about IT projects and their approval, but in another direction than PM initially intended. Whereas people were used to explaining their project informally via a memo, now they had to think through costs, benefits and risks and shape them into the format ITEM provided. Although to some extent they were enrolled to use ITEM-reports, they hardly were enrolled (and give up time and effort) to use it the way PM had intended. Moreover, the other elements of ITEM related to the scoring, prioritisation and decision-making can be seen not to be enrolled at all. This fact only seems to upset PM – the decision-makers are used to these 'irrational behaviours' and are at ease with them. They do

not seem to share the vision of 'rational decision-making' that PM holds. However, the department of Finance supports PM in their view. This can be understood by the fact that PM and Finance would also like to use ITEM for *ex post* evaluation (which requires hard measurable statements), whereas the decision-makers are comfortable judging *ex ante* non-measurable information. The functions (Legge 1984) they attribute to ITEM are different.

Still, ITEM is enrolled and all actors find it a way forward, although some of them say it is just a start; they point out that ITEM-reports should have more quality and that they should also be enrolled in other life cycle stages – not only in decision-making, but also in *ex post* evaluation and evaluation at realisation.

6.4 CONCLUSION – UNDERSTANDING THE EMPLOYMENT PROCESS OF ITEM AT IIC

To understand the employment of IT evaluation methods, we have analysed the case of IIC. Applying the diffusion theory we come to see the results of IIC as a failure or at best a limited success in the employment of ITEM. Though diffusion theory has provided us with a structured analysis of the case and identified numerous potential influences affecting the employment process, it was found to be too limited to sensitise us to the actual impact of the evaluation method. To discard the innovation as a failure would neglect the profound impact ITEM has had at IIC.

For a better understanding, we have suggested applying ANT. We shifted focus from seeing ITEM as a type of fixed innovation (*diffusion theory*), to a perspective where ITEM can be regarded as an actor in a translation process (*ANT*). Similarly, understanding of the employment process has shifted from a black-or-white adoption (*diffusion theory*) to a view of a dynamic attempt to black-box ITEM and mobilise it in a translation process (*ANT*).

We argued that the evaluation method cannot be seen as a neutral or objective tool, but as an actor inscribed with all kinds of assumptions and interests. Many of the assumptions are based on a discourse of rational decision-making and particular views on how to value IT investment proposals. The method can be regarded as

black-boxing the interests of a number of actors that have inscribed their ideas into it. ITEM is not a simple form of report, but a way of seeing; creating a world rather than describing a world. Moreover, it brings along its own preferred behaviour and roles for surrounding actors. For example, behaviour for shaping investment proposals, for valuing (score) the proposals and deciding on which proposals to approve. Moreover, it shifts roles, moving from an actor who used to have no voice to an obligatory passage point (e.g. PM).

During the dynamic employment process we see ITEM as an actor trying to find its place in the existing actor-network of IT evaluation within IIC. In the process, different actors impute ITEM with interests, but at the same time ITEM through its inscriptions and allied actors, imputes with certain roles as well. In a way, ITEM is telling them how they should use it and what kind of behaviour is expected from them to suit its specific purpose. The surrounding actors on their part tell ITEM how (and if) they are going to use it and for what purposes. This process generates friction. On the one hand, we see actors changing their work processes to write ITEM-reports, we see ITEM becoming a spokesperson for the IT investment proposals, shaping their plea for budget and we see ITEM influencing decision-making. On the other hand, we see that the way ITEM is used goes against its inscriptions: political behaviour influences the way ITEM-reports are written; discussion on investment proposals is a fierce debate rather than a neat scoring technique and the actual decision-making does not resemble the envisioned rational decision-making. ITEM struggles to translate its surrounding actors. Vice versa the surrounding actors translate ITEM, each from their own interests and inscriptions. It is a process of *mutual translation.*

Followed over time, we see a transformation of ITEM under the influence of all (both human and non-human) actors. Changes occur by planned actions (e.g. adapting ITEM according to newer insights gained from Information Economics and Balanced Scorecard), by improvisations to unexpected events (e.g. strengthening the inscriptions of ITEM along the way, to get it adopted and PM scoring the projects themselves, when business failed to do it) and by emergent events (e.g. ITEM not being used in times of budget crisis). From an outside perspective, ITEM seems to

drift away uncontrollably from its original ideas. It changes roles, varying from tool to listing investment proposals, to communicating them and even deciding on them.

This complex social process is governed by strategic, political, economical and technical forces, all of which make up the result. When we unpack the black-box ITEM, we see that a few of the original ideas have been translated in the resulting actor-network. The adoption of ITEM cannot be seen as a successful translation since what gets adopted does not resemble the planned results as envisioned by PM. However, it is no failure either; there is no reverse translation to get back to the previous actor-network. In fact, ITEM has had an indisputable effect on the organisation with regard to visibility, communication and decision-making of IT investments. An effect that is welcomed by all (human) actors, who in varying degrees express satisfaction with ITEM (discussed in sections 5.4.11 and 6.3.4).

Chapter 7: Research Discussion

7.1 INTRODUCTION

Our research questions is formulated as: "Why do organisations generally seem to be unsuccessful in employing IT evaluation methods that help them in clarifying costs and benefits of IT, despite multiple expressions of the need for more insights into costs and benefits of IT?" In this chapter we will try to formulate an answer to this question.

Using the insights gained in the case study, we will explore how our perspective on IT evaluation employment has changed and how this new understanding helps to answer our research question.

Based on the limitations of diffusion theory and the insights gained from ANT, we will argue that seeing an evaluation method as a (neutral) tool or innovation that can be adopted by an organisation is too limited in its scope to understand fully the process of introducing IT evaluation methods in organisations. Instead, we will argue that an IT evaluation method can be viewed as an actor which translates and is translated – a *mutual translation*. The introduction of an IT evaluation method can be understood as a dynamic and complex social phenomenon. Failing to enrol actors gives the appearance of failure. However, viewing the events from a perspective of mutual translation, changes in both the evaluation method and the employing organisations often do take place, though these changes may not resemble the initially intended outcome. This chapter gives evidence to support this argument. This perspective helps to understand the dynamic process of introducing IT evaluation methods in an organisation.

Furthermore, we discuss the contributions of diffusion theory and actor-network theory in the analysis of our case study. The apex of this chapter is its conclusion which addresses the research question and how its underlying paradox may be solved.

7.2 DISCUSSION OF FINDINGS

7.2.1 Introduction

In this section, we will have a conceptual discussion about the findings of Chapter 6: How did it change the view of IT evaluation employment (discussed in Chapter 3)? How can we understand IT evaluation employment? How does this conception help us understand the (sometimes peculiar) things that happened in our case study?

The case study clearly shows that during the construction of the method certain ideas were employed while others (consciously and unconsciously) were not. This shapes the nature of the evaluation method. During its employment, it changes both with respect to its content (e.g. format, criteria used, etc.) and its use (e.g. application for justification, scoring, prioritisation and decision-making). This occurs under the influence of many different actors who act based on their ideas, blue-prints and inscriptions, but who also react to emergent situations. At the end of the day, the method is employed, but in a sense it does not match the initial intentions. The method itself during employment influences actors' behaviour, roles and prerogatives.

Our case study is an example of how an IT evaluation method can be employed by organisations. It will vary according to the context and from actor-network to actor-network. The employment of such a method is a complex social phenomenon, and it should be understood accordingly.

This section, based on the analysis in Chapter 6, is devoted to a new understanding of the employment of IT evaluation methods. The major findings subsequently discussed are:

- IT evaluation methods are not 'neutral tools';
- IT evaluation methods can be viewed as actors when attempting to understand the dynamics of the process of employment;
- Mutual translation: the actor (en)acts and is enacted. What gets employed does not resemble the original intentions;
- Employment as emergent rather than blue-printed.

7.2.2 IT Evaluation methods are not neutral

One of the important premises that underlie the results of this research is a critical perspective towards IT evaluation methods. Many researchers concerned with the topic of IT evaluation base their knowledge on the idea that IT evaluation methods are neutral objects that have no politics. Though nothing new to critical researchers, this research has reinforced the fact that evaluation methods are far from neutral or objective. An evaluation method is in fact a social construction which locks in many assumptions and notions.

In the evaluation employment process the interests of different actors are translated in a 'program of action' inscribed into the method. A translation presupposes a medium or a 'material into which it is inscribed', that is, translations are "embodied in texts, machines, bodily skills [which] become their support, their more or less faithful executive" (Callon 1991, p. 143). In other words, the ideas and notions of different actors become embedded in the evaluation method.

A dominant notion locked in many of the evaluation methods, including the one in our case study, is the notion of rational decision-making (see sections 3.2.5 and 3.4.5). Another important notion is the perspective on the (financial) value of information. Failing to see that the value of information is a social construction, with multiple relevant views through different interpretations, results in a misconception that the value of information can somehow be measured objectively and captured by a neutral tool. This feeds the idea, for example, that a tool can measure the value of information and come up with the best investment proposals.

This research argues that IT evaluation methods could be regarded as black-boxes which lock in different actors and assumptions. There are two ways in which such methods can be perceived to be black-boxes. First of all, they black-box the notions and ideas of different actors, obscuring them and presenting themselves as generic solutions to IT evaluation problems in different contexts. Secondly and closely linked to the first, IT evaluation methods are not self-contained text formats that produce (just) informative reports, but they also bring along ideas and visions about which criteria are important when it comes to making decisions (see section 3.2.7),

how to carry out decision-making and how investment ideas can represent themselves in fixed formats.

Though often not explicitly described, these processes and notions are inextricably bound up with these methods (see section 3.2.5). All of these notions are 'packaged' (Newell, Swan *et al.* 2000) within the evaluation method. Hasselbladth and Kallinikos (2000) contend similarly that distinctive forms of organisational actorhood (such as a controller, a financial analyst, a personnel administrator) are inextricably bound up with methods and techniques (accounting, financial techniques, human resource management) for framing action and measuring its outcomes. The better an IT evaluation method can shape such an actorhood (i.e. create and support an IT evaluation function), the more chance it has to be institutionalised (Hasselbladth and Kallinikos 2000) since actors (e.g. in our case PM) will mobilise it.

We argue that to understand IT evaluation employment we should not focus on the employment of certain (technological) artefacts, but on the employment of the particular (overt and covert) ideas underpinning the evaluation method and the interests they serve. Just as the other actors in the actor-network, the IT evaluation method brings its own ideas, politics, definitions of roles and inscriptions to the scene, influencing its surrounding actors and the flow of events.

7.2.3 IT Evaluation methods as actors

In Chapter 6 we have argued that viewing an IT evaluation method as an actor in its own right gives a better understanding of the process of IT evaluation employment than by viewing it merely as an artefact. It is regarded as an actor since it is a network, a black-box that participates in the social; it becomes spokesperson for other actors; it translates other actors; it becomes translated itself – results do not match intended outcomes. During the process of employment, the method and its attributes is negotiated by many different actors and must find its own spot between them. The method imposes its inscribed program of action on its users, thereby becoming an actor in its own right.

7.2.4 IT evaluation employment as a process of mutual translation

In our case analysis, we have argued that the employment of ITEM is governed by a mutual translation: the method translates other actors and is it itself is translated as well. Usually the notion of translation in ANT is used to denote the process between two actors in which one of the actors gives definition to another actor, "imputes him/her/it/them with interests, projects, desires, strategies, reflexes, afterthoughts" (Latour 1991). The actor tries to align the interests of the other actors to its own (Callon 1986b). In our case study this is visible in the way ITEM is translating the roles of different actors (see section 6.3.6). Moreover, the method gives voice to the investment proposals and in doing so shapes how they are able to present themselves (see section 6.3.3).

But the (new) technology with its inscriptions is not the only actor that is involved in carrying out a process of translation. Other actors in the network also carry out translations – attempting to translate the technology to a form and position that is aligned with their interests. Clearly, the efforts of PM are visible in ITEM. Over time, PM translates ITEM to change working processes from an optional reporting process to an obligatory and decisive decision-making process; in this process PM is aligning it more and more with its interests. More covert are the translations by business managers and end-users who are aligning it to their interests (see section 6.3.5). Users may use the system in an unanticipated way (follow an anti-program) rather than following the assigned program. In the end, the method is used in many different ways and for all kinds of different purposes (the re-inventions of ITEM, see section 6.2.5) that go against most of the ideas inscribed in the method itself.

In the process of obtaining a position in the network, ITEM assigns roles to its surrounding actors. It imposes particular views on them, with regards to the purpose and use of ITEM. This imposing is partly due to the inscriptions in ITEM and partly due to the way ITEM is positioned by other actors (e.g. PM) in the network. The other actors in turn have their own ideas on how they aim to use ITEM for their purposes and in a way that is appropriate for them. There is friction between the interests of the two, visible, for example, in the political behaviour in which the method is used as opposed to its inscriptions (see section 6.3.5). In a way, the method

tries to translate the roles of its surrounding actors, while the actors are simultaneously trying to do the same to the method.

As a result of different acts of translation, the final shape and position of the innovation in unlikely to be that of the original developers (Mitev 2000). Actors adapt the evaluation method during the process, and the technology often cannot fully persuade other actors to follow its initial goals. The employment process is a dynamic negotiation (Monteiro 2000). Moreover, unintended effects occur resulting in changes in the network. The resulting network is the (combined) translation that becomes irreversible; it becomes impossible for other (past or future) translations to develop and impose themselves.

Some researchers compare this process of translation to a battle (Mitev 2000) where only one of many possible translations is able to 'win' and become irreversible. This process can however also be viewed as negotiation and sense-making (Weick 1990), drifting (Ciborra, Braa *et al.* 2000) or improvisation (Orlikowski 1996), implying not a given number of possible translations, but rather one translation that is shaped by different actors during an emergent process. A difference between the latter three and the prior is that the notion of translation stresses the pursuit of *interests* (i.e. a form of intentional and pro-active behaviour) rather than mere *local adaptations* (i.e. a form of interpretation and more reactive behaviour); hence the term 'battle'.

Moreover, as discussed here, the notion of mutual translation implies that the artefact that is *improvised* or *made sense of* can itself play a vital and active part in this process. In fact, it is not a passive artefact that can be shaped (within certain boundaries) at will by its surrounding actors, but it is an actor that imposes worldviews and its inscriptions on its surrounding actors: it *makes sense* and *improvises* its surrounding actors itself. Or, as Akrich states: technical objects may be reinvented and reshaped in use, as "technical objects and people are brought together into being in a process of reciprocal definition in which objects are defined by subjects and subjects by objects" (Akrich 1992, p. 222). So the process of translation is not unidirectional. Actors are invariably self-interested[28], and network

[28] For a non-human actor such 'self-interest' can be viewed as striving to hold on to its inscriptions (for example, to hold on to a rational view of decision making).

building is thus a process of mutual enrolment and shaping (Doolin 2001; Bloomfield and Best 1992; Law and Callon 1992). We have used here the term *mutual translation.*

7.2.5 IT evaluation employment: translation failure or success?

One of the main reasons for this research was the observation that although organisations express the need for having a better grip on IT costs and benefits, they *fail* to employ IT evaluation methods. But what does the success or failure of IT evaluation employment mean? Employment can be seen as being a success (by an actor) when intended or preferred outcomes (by that actor) have occurred (see section 1.2.2). Success in ANT can be seen to depend upon the ability to create and sustain black-boxes (Vidgen and McMaster 1996); the technology has become *ready-to-hand* rather than *present-at-hand* (in case of break down). In other words, successful employment would entail that the evaluation method has become a black-box; it is taken for granted and employed by those intended. Law (1992) states (cited in section 4.3.2) that the core of the actor-network approach is its concern with how actors hold together the bits and pieces out of which they are composed and how such heterogeneous networks come to pass as a punctualised actors.

We see a dichotomy in our case study if we regard the results intended by PM to be the preferred solution. On the one hand, ITEM is visibly being used by IIC and can therefore be said to have been punctualised and black-boxed. On the other hand, the results ITEM is giving is not what PM had envisioned when it had introduced ITEM at IIC (see section 6.3.5). The resulting translation can be said to have happened (*success of translation*), but does not resemble intended (*or 'preferred'*) outcomes (*failure of outcome*). The reason for this can be understood from the perspective of *mutual translation.* The intended outcomes did not fully occur due to translations that different actors imposed on the innovation.

But the success of the translation may well be the result of the failure of outcome. Or as Latour argues (Latour 1986), "the movement of an innovation through time and space is in the hands of actors, each of whom may react to it in different ways. They may accept it, modify it, deflect it, betray it, add to it, appropriate it, or let it drop." Each of these actors shapes the innovation to their own ends, but if no one takes up

the innovation then its movement simply stops; inertia cannot account for its spread. Instead of a process of transmission we have a process of continuous transformation (Latour 1986) where "faithful acceptance involving no changes is a rarity requiring explanation" (Tatnall 2000). The seemingly self-perpetuating process whereby a solution spreads, gains inertia, irreversibility, gathers momentum or picks up speed is neither automatic nor necessary (Monteiro 1999), but an ongoing effort to keep a decision alive, to conquer opponents, to co-opt opposition, to seize opportunities for support and improvise on 'surprises' and unintended consequences. Without this on-going alignment process, the motion would stop – the actor-network would fail to become stable, and the evaluation method would not be black-boxed.

In fact, to think that the method is employed once and for all is a myth, as Law (1992) argues: "I have insisted that punctualisation is a process or an effect, rather something that can be achieved once and for all. Thus, actor-network theory assumes that social structure is not a noun but a verb. Structure is not free-standing, like scaffolding on a building-site, but a site of struggle, a relational effect that recursively generates and reproduces itself. The insistence on process has a number of implications. It means, for instance, that no version of the social order, no organisation, and no agent, is ever complete, autonomous, and final." In other words, if the evaluation method would not be translated - would remain fixed and stable - it would likely die (Monteiro 1999).

Due to mutual translation, the result of the employment of IT evaluation becomes unpredictable. It is an emergent rather than blue-printed process (Orlikowski 1996); a continuous process rather than one that ends (Law 1992). Understanding the evaluation method as a black-box, which packs different interests and actors, can help describe how only some of the elements in the method become employed while others are rejected, modified or appropriated.

Moreover, to expect a clear-cut success or failure might be too simple. This already is voiced in the discussion by Rogers in his idea of adoption versus rejection of innovation (discussed for our case in section 6.2.4). Moreover, just as evaluations themselves may have no dramatic effect, but a more gradual effect over time (see section 3.3.3), so we can perceive the employment of IT evaluation methods as well.

It seems unrealistic to expect that all actors employ the evaluation method and dramatically align their interests to this method. This is a gradual process with mutual alignment and mutual translation. It seems reasonable to assume that many evaluation method employments in the past have been classified as failures only because they did not cause the dramatic effect hoped for. These hopes are however unrealistic. An expectation of a more gradual impact seems a more faithful representation of what is happening. Our case study highlights this by the respondents who claim that ITEM has been employed and that it is in fact a way forward, but still argue that more 'improvements' should be made.

In sum, we can see that certain ideas and parts of the evaluation method are employed, but also that some important parts are not. What happens depends on the inscriptions, the influences the method has on connected actors and the influences other actors have on the method itself. The selection is improvisational but reflects actors' interests. Overall by selectively and partially enrolling its inscriptions, the character of the evaluation method changes. Thus, it becomes unlikely that the employed method will resemble the intended method; this could be a reason for the described gradual effect of the evaluation method described above. However, important parts of the method have been employed, be it in a modified way. In this sense, the method does have a profound impact on the organisation and the way IT is managed from an economic perspective.

7.2.6 Conclusion on the findings

To deepen the understanding of the employment of IT evaluation methods and its apparent problems, we need to reframe our perspective. It is not a matter of 'adopting a tool', but about the translation of ideas and artefacts packaged together as a black-box – an actor. Seeing the evaluation method (the innovation) as a given, neutral thing, results in the idea that adoption of evaluation methods fail. Looking at it from an actor-network perspective, we see that the method changes over time. In a dynamic process (which cannot be reduced to a set of simple factors), it translates actors and is translated by actors; it acts and is enacted. In the process of employment, a metamorphosis (under the influence of planned, emergent and improvised change by different actors) shapes the method and in so doing allows it to transform in someway so that it can find its place in the network. But not only that,

the method has profound impact in the sense that it translates (the roles of) many organisational actors. In this way, it is not just an *improvisation* (Orlikowski 1996) from one actor on another, but rather a mutually transformative improvisation.

Moreover, efforts to get a method employed are not fruitless, but have a more gradual, emergent impact instead of a dramatic impact. The results are not likely to resemble the intended outcomes, but can have a profound impact on the way costs and benefits are managed in organisations and on how managers tackle problems when faced with addressing this issue. In fact, it could be argued that translations of the method might be the reason for its employment altogether; the necessary on-going alignment process leading to a stable network where the evaluation method is black-boxed.

7.3 DISCUSSION OF THE THEORETICAL FRAMEWORKS

7.3.1 Introduction

Here we will discuss the analysis of the case and the contribution of the diffusion theory and ANT and their limitations in the analysis of our research.

7.3.2 Insights gained from diffusion theory

In retrospect, the most important contribution of the diffusion theory to this research is that it was a useful point for departure for understanding the employment of IT evaluation methods. Our literature review (Chapter 3) and hypothesising in the light of a diffusion-theory approach about possible influences in the process of employment from the start, helped to sensitise us in our data gathering and analysis. We acknowledge that diffusion theory has provided and is still providing research with many useful insights – and indeed these insights have impacted what we consider to be relevant for our case description and analysis.

However, rather than perceiving such influences as generalised predictors of change or automatic mechanisms to control change, we have argued that the localities and context of a particular case need more attention than diffusion theory can provide. Moreover, a simplistic explanation of the case study is to see ITEM as a tool which failed to be adopted due to its characteristics. Diffusion theory has a strong focus on

the characteristics of the innovation (the evaluation method), rather than on the difficulty of the context and process by which the employment (should) occur. The innovation in fact has no general 'characteristics', and Rogers is right in saying it to be 'perceived characteristics' (Rogers 1995) – they might be very different from individual (actor) to individual (actor) due to diversity in interpretation. Or more accurately, the innovation is interpreted differently by different actors and therefore *is* different to these actors. It is not a matter of some 'clouded' perception, it is the fundamental view that there are multiple realities where underlying beliefs, values and assumptions shape these realities (see section 2.2.3).

In our analysis using diffusion theory, we came up against some interesting problems. These problems could not, however, be dealt with by using this same theory; for example, the problem of the profound impact of re-invention. However, diffusion theory helped in uncovering and formulating these problems so that they could be tackled. The questions raised were (see section 6.2.7): What gets adopted? Who adopts? How does the evaluation method change the organisation? How does the method change decision-making? How does the adoption of the evaluation take place? Why were suggestions from the method in this case not followed by targeted adopters (e.g. general management)?

These questions show that although popular in many studies concerning adoption or employment of innovation, diffusion theory, apart from its other limitations (see section 4.2.4), in this case highlights but cannot address the problems that in the end turn out to be the most crucial to this research.

Some notions crucial to this understanding are hinted at by diffusion theory. For example, Rogers notes that "flexibility in the process of adopting an innovation may reduce mistakes and encourage customisation of the innovation to fit more appropriately to local situations or changing conditions." In other words, "re-invention is beneficial to the adopters of innovation" (Rogers 1995, p. 178). Moreover, he concludes that the designer of an innovation can affect the degree of re-invention by making the innovation easy or difficult to re-invent. He wonders if it may even be a good idea for change agents, formerly opposed to re-invention, to

encourage clients to modify an innovation (ibid, p. 179). This comes very close to the notion of flexibility and inscription in ANT (further discussed in the next section).

But although Rogers talks about re-invention, he focuses strongly on the innovation itself – disregarding the way the innovation changes the organisation, individuals and actors. Technology and evaluation methods in this view play a passive role – they are used, but do not act themselves. To make a short detour, the opposite critique could be given to researchers that grant the evaluation method a definite (almost deterministic) role. For example, Legge (1984) considers an evaluation outcome (or report) something given – something that has been constructed and can be used in *planned* evaluation (overt and covert) 'functions' (see section 3.2.1). She concludes that the gradual impact of the evaluation can be seen in most cases and considered a successful use (as opposed to a radical impact, which positivist researchers only would classify as a 'success').

But as we have seen in our analysis of the case study in section 6.2.5 and section 6.3.6, once the evaluation is constructed it also plays an *unplanned* role – it is creating its own overt and covert functions. Examples include: before ITEM existed, users did not plan to use an evaluation method to get budget; users did not think of quantifying IT benefits; when the initial evaluation experiments showed the high costs of IT, general management gained interest in knowing about costs in more detail; prior unheard investment proposals came to see ITEM as an opportunity to enter the investment process; ITEM presented the opportunity for PM to become an obligatory passage point.

So it does have impact (is utilised) not only in a planned way, but also possibly in other areas than was intended. In ANT terms, it becomes part of a network that is influenced by its creation. It is not only 'utilised' for different functions as a passive artefact which a (human) actor can choose either to use or not, but becomes part of an actor-network in which it also defines ('utilises') its surrounding actors. The evaluation method may be 'reinvented', but also 'reinvents' its surrounding actors. Its existence alone already makes a difference – both in planned, but also in unplanned, emergent ways.

In our case, 're-invention' rather than being something out-of-the-ordinary seems to be the norm. Just like improvisation as form of organisational change can be seen as the norm in organisational behaviour. Orlikowski (1996) suggests that planning is not an activity which is unnecessary or should be abandoned, but instead, that a plan is a guide rather than a blueprint, and that deviations from the plan, rather than being seen as a symptom of failure, are to be expected and actively managed. The employment of evaluation methods can be understood this way. The planned and unplanned interaction between all actors (both human and non-human) results in an emergent phenomenon.

An extension to the traditional diffusion theory is a knowledge-focused perspective (Newell, Swan *et al.* 2000), discussed in section 4.2.5. In this view, the evaluation method can be seen to be a packaged object of knowledge, bundling general knowledge on IT costs / benefits management, which needs to be unpacked in the process of employment. However, the way this is perceived, it still looks like the innovation (e.g. the evaluation method) packs the knowledge itself (though packed). ANT by contrast would argue that the method is an actor which is not only defining itself, but is also defined by its surrounding actors. In other words, the 'knowledge the method packs' depends on the surrounding-actors (which are context dependent). This goes beyond the notion of some general (neutral) knowledge which can be unpacked differently in different contexts. In our understanding, there is no such thing as 'one package of the evaluation method' which is packed earlier by some actors and can be unpacked at different times and contexts differently, but rather in employment the 'packing and unpacking' of the method occurs at the same time – by all its surrounding actors. The knowledge-focused perspective is limited in understanding that the actors packing the evaluation method (or any other innovation, such as BPR, for example) have neither detached themselves from it, nor that it can be inscribed 'strongly enough' to determine the outcome of the unbundling. Moreover, much of the knowledge is not pre-packed, but rather created in the context while 'unbundling'.

In conclusion, diffusion theory has served in defining questions to sharpen our understanding of the evaluation process, although it did give clues that pointed in the direction of ANT to look for answers to these questions. Rather than focusing the

analysis either on the (attributes of) the innovation, the actors that supply the innovation, the actors that receive the innovation, or the channels by which the innovation is diffused (in a political way), we looked for a holistic explanation – coming to ANT as a possible sensitising holistic approach to understand the spread of this innovation. We come to see the method not as a passive artefact that is enacted by some external actors, but as an actor in its own right with its own inscriptions, ideas and visions.

7.3.3 Insights gained from ANT

Clearly, the results obtained by this research have been based heavily on ANT's central notions of actor and translation (see sections 6.4 and 7.2). Some additional notions in understanding the employment process of IT evaluation methods from an ANT perspective are taken somewhat further here. We will discuss the notion of *flexibility and inscription, the process of creation of a black-box* and the notions of *interessement devices and competing translations*. Furthermore, we will explore some of the limitations of ANT that we have encountered in our research. We discuss the limitations of social structures and a political analysis (which have been acknowledged in section 4.3.4 as limitations in ANT).

Flexibility and inscription

Discussing the design of an infrastructure, Hanseth and Braa in applying ANT propose a strategy to deal with new infrastructures with respect to their irreversible installed base (e.g. the existing infrastructure it is supposed to replace). They suggest "to fight against the power of the installed base by building an infrastructure in a way that makes it possible to avoid being trapped into it. This means making it as flexible as possible. Flexibility can be obtained through general strategies like modularisation and simplicity" (Hanseth and Braa 1998, p. 195). In ANT terms, this means that innovations, or in our case evaluation methods, with inscriptions that are too strong are likely not to be employed since "inscribing patterns of use is a way to confine the flexibility of use" (Monteiro 2000, p. 78). If the method is flexible and less inscribed it is better able to ally with other actors and appropriate and align (to) them. Moreover, Law (1992) argues that the core of the actor-network approach is this ever-changing actor. Punctualisation (or black-boxing) is not something that is achieved once and for all but is a continuous process.

The more flexibility the evaluation method has in dealing with this 'struggle', the better it can appropriate itself. In the case of an evaluation method, this would argue for keeping the method simple and aligned with current practices with regard to IT evaluation in the organisation (as was proposed in section 3.3.4). Moreover, adhering to an improvisational form of organisational change, rather than a blueprinted and fixed one, the evaluation method might be adjusted and *improvised* (Orlikowski 1996) on the basis of actions the other actors take. The act of mutual translation resides on this.

In the case study, the flexibility of ITEM is apparent. Under the influences of the translations of surrounding actors, ITEM moves around flexibly. Changing appearances and properties, it stays the 'ultimate answer to the problems at hand'. Firstly, to support the organisational changes required in the solution to the legacy problem, then to support program management with their incomplete view on projects running (project calendar), and then continuing on by informing management of some of the contents of the projects (PCT) and later doing this in more detail (ITEM-report). Finally, it attempted to support the envisioned rational decision-making.

This notion of flexibility relates to strong inscriptions which actually seem to be contradictory. It states that rather than flexibility, the employment of evaluation methods could be served better by having strong inscriptions. This seeming contradiction will be discussed after we have elaborated on this point.

Inscriptions are about 'disciplining use' by actors. The strength of inscriptions, whether they must be followed or can be avoided, depends on the irreversibility of the actor-network they are inscribed into (Hanseth and Monteiro 1997). Callon (1991) discusses the concept of (possible) irreversibility, where translations between actor-networks are made durable, to the extent to which it is impossible to go back to a point where that translation was only one among others and, secondly, to the extent to which the network shapes and determines subsequent translations. Some technologies inscribe weak/flexible programs of action while others inscribe strong/inflexible programs. Examples of the former are tools, the hammer being a

classic example, and the assembly line of Chaplin's "Modern times"' a standard illustration of the latter (Monteiro 2000).

According to Latour (1999b) the strength of inscriptions can accumulate by adding and superimposing them. By adding and linking inscriptions the inscription becomes stronger; for example, by inscribing the same pattern of use in a training program, a manual and an information system. Thus the same work routine may be inscribed into different materials, strengthening each other (Hanseth and Monteiro 1997). Inscription can also be made stronger by a succession of stronger translations. This is demonstrated by Latour (1991) when he discusses the example of a hotel manager who steadily increased the weight of the knob on hotel keys to the point where he was able to adjust the behaviour of guests to return their keys to hotel desk. Prior attempts to achieve this effect by inscribing the desired behaviour on a sign behind the counter failed. Making the key knob heavier strengthened the inscription resulting in the desired behaviour.

In other words, it could be argued that the more an evaluation method is inscribed with a certain behaviour, the better it is able to appropriate (or discipline) other actors surrounding it. In the case of an evaluation method this could entail inscribing the preferred behaviour strongly in the method itself by having clear criteria and explanations and examples of use. Furthermore, the inscription can be strengthened by adjusting the contents and evaluation procedures along the way to better obtain the preferred outcome (e.g. enforcing the method by changing the behaviour of the other actors). One example of this in our case study is PM's intention to have an *ex post* evaluation and compare the evaluation results with the *ex ante* evaluation results, and thus make actors accountable for their *ex ante* estimations. Actors who (continuously) have big discrepancies between *ex post* and *ex ante* results can be 'disciplined' further. Another stronger inscription can be obtained by inscribing the preferred behaviour in other artefacts, for example, in other management processes (such making the use of the method in the construction of long-range plans obligatory).

We can see that there is a seeming contradiction here in ANT. On the one hand, a translation seems to be helped by keeping the evaluation method flexible. On the

other, it can be argued that stronger inscriptions can help to reach more stable networks. However, even very strong inscriptions do not have to lead to a successful translation. The actual use may deviate from the inscribed patterns of use by following an anti-program (Latour 1991) in which actors use the innovation in an unanticipated way rather than following its assigned program of action. Even more so, Hanseth and Monteiro (1997) argue that unanticipated consequences, stumbling and opportunistic choices are always happening. The direction in which an actor-network is evolving through inscriptions is generally speaking much more vague than Latour's example of the keys in the hotel. The possible directions of network evolving are only spelled out as one goes along, constantly improvising and open to surprises.

Moreover, for "technology, every day is a working day" (Latour 1996a): actor-networks never become stable once and for all. The stability of a network lasts only as long as its constituent actors do not resist the role or definition they have been enacted to fulfil. If one of the actors enrolled in a network resists enrolment and defines itself differently from its simplified definition (that is, the simplification fails), that actor becomes complex, possibly leading to the modification or disintegration of the network (Doolin 2001; Callon 1986b). For complex innovations this means they are balancing between being inscribed in an actor-network, but also constantly being threatened and resisted by its constituent actors. Moreover, the durability of a network is a relational effect, not something given in the nature of things (Law 1992). If materials behave in durable ways then this an interactional effect. "Walls may resist the escape attempts of prisoners – but only while there are also prison guards" (Law 1992). In other words, the strength of an inscription is not localised or fixed to the inscribed artefact but depends on the network in which it is inserted.

In the end, it is not possible to know beforehand exactly what it takes to make an inscription strong enough; it is a question of practical trial and error (Hanseth and Monteiro 1997). The question then becomes how to accumulate enough strength for this inscription to actually enforce the desired behaviour of general practitioners. In the examples given above we can see that keeping the method at some point flexible and at other points having strong inscriptions is not necessarily contradictory.

The process of creation of a black-box

Stability in a network comes from black-boxing. When the evaluation method is black-boxed, it can be seen to become a natural part of the network. As seen in section 4.3.2, ANT theorists discern different ways to come to this black-box (e.g. the four moments of translation by Callon - 1986a – and the strategies for enrolling others by Latour - 1987; see section 4.3.2). In the case of an evaluation method these strategies could entail the search for (strong) allies. In our case, ITEM allied with PM and general management to impose itself onto the business managers. Moreover, PM problematised the problems of legacy systems and initial insights by ITEM problematised high IT costs – both suggesting ITEM as the solution to these problems. Better enrolment, and ultimately the creation of black-box, thus comes when the interests of different actors are better aligned.

But what can be said about the black-boxing of ITEM in our case? ITEM comprises different components, including visions, philosophies and assumptions about what evaluation is, what information systems are and how they can be valued. However, it is a black-box that is enrolled in a different way than was intended. Some parts are discarded (e.g. the scoring in prioritisation), some parts are enrolled (e.g. the format of the ITEM-report; the representation of IT projects; the role of the Finance Department to calculate financial details) and some parts are enacted differently (e.g. 'irrational' use of the ITEM-report rather than the envisioned 'rational' use; the use of the method in decision-making as one of the inputs rather than as the only input). All of these parts are however not distinguishable from the 'outside'; the black-box can be said to have been created during the enrolment. However, the association patterns concerned with ITEM cannot be moved to other networks or contexts and are unlikely to remain stable through time. ITEM cannot be considered an *immutable mobile.*

Interessement devices and competing translations

One way to view a translation as successful is when it prevents both other translations taking place and a reversal of the translation. Describing a failure of translation, Vidgen and McMaster (1996) give an example of the latter. In their case where new technology fails and the intended translation is reversed due to the

enrolment of (perceived) failures of the technology. The translation is reversed back to the old network (a state without the technology).

Callon (1986a) describes the use of interessement devices to "lure" the concerned actors to follow the project. This may differ from simple force to seduction or solicitation – whatever is necessary to make other actors follow the intended translation. The interessement devices used to interest actors in the intended translations can be any artefact which gets the job done (e.g. ranging from towlines to texts and conversations).

In our case, the adaptations of ITEM by PM can be seen to prevent other translations (by business managers) that translate ITEM into something that PM had not intended. The latter translated the ITEM-report not as an 'objective representation of the expected results' but more as a 'means to get budget', or as a 'time-consuming activity that needed to be done'. One option mentioned to reverse 'unwelcome improvisations' by managers was, for example, to demand that the Finance Department make financial calculations or append *ex post* evaluation in an attempt to eliminate the political behaviour of managers which led them to overestimate benefits or underestimate costs. However, the effect of such tactics is hardly likely to have the desired effects; politics cannot be eliminated by techniques (which are inherently political as well), though they might change the way such politics express themselves (Nijland, Berghout *et al.* 2002). The information manager is another nice example of an interessement 'device' in our case study. When a number of business managers visited PM to complain about the cumbersome aspects of ITEM, the information manager of that same business unit was used to persuade them to employ ITEM in spite of the amount of time and energy it took.

Critique on disregard of social structures

ANT has been criticised for its disregard of broader social structures that influence the local phenomenon (Walsham 1997). ANT seems to stress the fact that social structures reside not only in the actions of people or in 'memory traces' (Giddens 1984), but also in the network of heterogeneous material arrangements. But, it can be argued, these 'memory traces' and their implicit social structures also need to be analysed for deeper understanding.

In our case study the limitation in this respect becomes apparent when we try to understand why some actors behave the way they do. Specifically the 'irrational behaviour', which ANT does not highlight, (such as politics, neglecting evaluation results and the like– see section 3.4.5) towards IT decision-making can be seen to be important to understanding the case. One would expect that such behaviour would result in the abandonment of the evaluation methods which have very incompatible, rational inscriptions. But, strangely enough, all managers perceived the new method (despite its flaws) to be an improvement with respect to IT evaluation. One possible explanation for this can be found in the social discourse where 'rational thinking' in managers dominates (which, for example, Walsham (1999) states as the 'Western way of thinking'), and which argues that a rational method is always better than no method.

Another explanation for this phenomenon from a critical perspective can be that the evaluation method has changed over time during its employment from its purpose to 'show the real IT costs and benefits' to a 'communication and decision aid'. It helps to explain both to employees and to general managers why certain decisions have been or should be made. Therefore it "creates a reality with more certainty and security for all involved" (McCabe, Knights *et al.* 1998). The method was altered from a rational method to a method that better supports the behaviour of the managers. This could even go so far that actors might accept the new method no matter what its underpinnings and inscriptions were as long as they are free to play their own preferred role.

In its disregard of social structures, ANT is a poor source on which to draw from when looking for explanations. It does not explain why certain actor-networks prevail over others. ANT does not uncover the origins of the interests of actors. It is ahistorical and does not take into account institutionalised structures or the interpretive schemes by which actors make sense of the phenomenon. For example, many of the actors in the case can be seen to be influenced by a rational discourse. They hold a rational view of the problem and therefore seek a rational solution, and argue: "To attain better insight in costs and benefits of IT, we have to develop a technique that shows us these things". This shapes the way they interpret events (e.g.

seeing evaluation results as having low quality) and the way they act (e.g. sharpen the tools). Understanding it would involve analysing the rational discourse, the norms and values within the organisation of IIC (and society as a whole) and possibly applying some theories of psychology to explain the behaviour of the individuals involved - just as a theory of biology would be required to understand the behaviour of the scallops in the classic ANT study of their domestication (Callon 1986a); and further inquiry would be needed to see if the interest of slowing-down motorists comes from a respect for law and life (following traffic signs and warnings) or from selfishness (avoiding car damage by the speed bump), an example given by Latour (1999b; also see section 2.2.5). ANT is not helpful in gaining such understanding, neither was it intended to be. ANT simply assumes that all actors have interests or inscriptions leading to outcomes. They can only be uncovered by zooming in (or out) and opening the different black-boxes of actors. This still however does not address the lack of regard for historical developments and social structures which may have affected the construction, the interests and inscriptions of the actor. Only by applying additional theoretical insights, for example, institutionalism (e.g. Powell and DiMaggio 1991) or structuration theory, as was suggested by Walsham (1997), could this lack be addressed. However, Latour would probably argue that the description given was not complete – that to understand better, more inquiries (for example, by further studying actors' behaviour) and descriptions should be made to make sense of the situation; descriptions that stem from the case, not from generalised theories. Though such theories might point in a direction to look for more description, they cannot be the final conclusion.

In our case study we have shed light on possible influences in contextual elements by describing the environmental and organisational discourses and developments in the insurance industry in general and for IIC in particular (see section 5.2). In addition, we described, based on the interviews and texts, the motives of different actors to explain their behaviour (see section 5.4). ITEM has been discussed to show where its inscriptions and underlying assumptions originate (see section 5.4.5 and 6.3.3). However, our research was not intended to uncover the different reasons for the (non-)employment of evaluation methods – in section 3.3.4 we have listed numerous possible reasons and influential aspects – in order to come to either an explanation for our particular case that could be applied to other cases, related to a particular kind

of social theory or to some sort of generalised conclusion on additional influential factors or discourses. Our research was aimed at understanding the employment process and ANT has provided us with a new perspective, helpful in this understanding.

Critique on lack of political analysis

Our case shows that to understand IT evaluation employment (or any organisational change for that matter), *interests* of actors should be perceived as being much more flexible than is usually accepted by researchers using ANT. Actors *are* willing to change their (political) inscribed behaviours, and they are not only stubbornly following their own interests. This is not just a matter of interesting other actors by 'force' or 'seduction' (Callon 1986a), or actors conducting a war, but instead can be regarded as a mutual alignment. What we see is that ITEM with its inscriptions is both disciplining use and is disciplined in use, but not always in a violent way. From our case we conclude that actors (both human and non-human) are not 'deterministically' bound to their own inscriptions – they are flexible.

One might argue that this depends on the 'strength' of the inscriptions. If actors still can use the technology or innovation in another way than was intended, the inscriptions can be said to be weak. To talk about the politics of an artefact then is "nothing but a convenient shorthand for a situation where the strength of the inscriptions of the artefact in question is very strong" (Hanseth and Monteiro 1997). Even so, ANT inherently has its struggle between seemingly fixed inscriptions on the one hand and networks never becoming stable on the other hand (Monteiro 1999). To what extent can a specific artefact or actor in a given context inscribe certain behaviour even though this behaviour may be challenged continuously? Even more so, ANT does not inherently question where a certain inscription originates: Whose intentions are inscribed in an artefact?

For evaluation methods, we observe that they 'create a world' by capturing reality in its reporting format. In our case, the originating inscriptions in ITEM can be traced back to PM, financial departments, IT Economics discourses and rational discourses (see section 5.4.5). But the case also demonstrates that actors are not that easily disciplined in viewing this world according to the method (see section 6.3.5) –

although ITEM is changing work processes, it influences the actual decision-making process very little, being only one of the inputs in the decision-making process. Though managers might be forced to use ITEM to get budget for their projects, it does not entail that ITEM has the power to translate them in its envisioned position.

We conclude that indeed politics are not easily understood from an ANT perspective. However, by alerting us to the political nature of the process, ANT does encourage us to trace the particular political positions of the actors involved. In our analysis of the empirical data in Chapter 5 we uncovered some of the reasons different actors have for their actions (also see section 6.3.7), and in Chapter 6 we elaborated on how an interplay between the actions stemming from different interests shape the emergent character of the employment of the evaluation method. However, we agree that more insight would be attainable if we would look more closely at the social structures and personal motivations of the different actors. As concluded in our critique above on ANT in its disregard of social structures, ANT does not provide any other means for better explaining politics than it does in using description.

7.3.4 Conclusion on the theoretical frameworks

Diffusion theory has offered a structured approach for understanding the spread of IT evaluation methods. It sensitised us to look for the influence of aspects found to be influential in previous studies on diffusion of innovations and then to look beyond them. It uncovered the essential questions which were then answered on the basis of actor-network theory. Though ANT has limitations, it offered a perspective very different from that seen in the evaluation literature and practice, shedding new light on the paradox that was central to our thesis.

7.4 CONCLUSION

We started this research with a research question derived from the mainstream discourse of the IT and IS literature, i.e. evaluation methods as tools to be used with the expectation of leading to useful effects. Paradoxically, the seemingly innate qualities of the methods did not lead to a broader employment of them. By applying diffusion theory, we found interesting nuances – some capable of being addressed by

more sophisticated versions of diffusion theory, others more fundamentally requiring an alternative analytical logic. The latter took us to ANT.

Though ANT does not justify from generalised (for instance, social or psychological) theories why actors acted in the way they did (i.e. the root of their rational and political behaviour), it helped us in gaining a new understanding. Prior understandings of evaluation methods as rational, neutral and objective tools that may be appropriated by organisations do not explain why the employment of these methods so often fail or are not considered at all. Instead, a new understanding is presented that the employment process involves an organisational change in which both the human and non-human actors (including the method itself) are decisive in the outcome. It is a process of mutual appropriation where the method that in the end gets enrolled is unlikely to resemble the initial intended outcome. In relation to Orlikowski and Iacono (2001), who suggested five premises to theorise the IT artefact in IT research, we claim that evaluation methods are not natural, neutral, universal or given; that they are embedded in time, place, discourse and community; rather than being a whole, uniform and unified piece, they embed a multiplicity of components whose interconnection are often partial and provisional; they are neither fixed nor independent, but emerge from ongoing social and economic practices; and that they are not static or unchanging, but dynamic (ibid, p. 131). But not only is the method appropriated, also the organisation that uses the method has changed; it no longer is the same organisation as it was. In its turn, the method itself has appropriated the organisational actors.

This leads us to argue that the research question only is relevant in our old understanding of evaluation, where evaluation is considered neutral and having innate qualities and the evaluation employment process considered as a blue-printed plan to achieve preferred outcomes. The old view of evaluation is blind to relevant organisational changes that may however be different than expected outcomes. Thus, the relevant question is not whether organisations employ formal evaluation methods, but how an organisation appropriates an evaluation method in its situation and how both the organisation and the method are transformed during the process.

Chapter 8: Conclusion – A Possible Resolution to the Paradox

8.1 INTRODUCTION

This chapter concludes this thesis by giving an overview of the thesis and then discussing the limitations of this study and suggestions for further research. It ends with explicitly addressing the contributions of this research.

8.2 OVERVIEW OF THE RESEARCH

In Chapter 1 we introduced our research question. We discussed earlier studies that showed that managers find it difficult to evaluate IT investments and that even though numerous concepts, methods and techniques have been developed to help managers make IT evaluations, paradoxically enough, very few organisations use them. The research question therefore is: "Why do organisations generally seem to be unsuccessful in employing IT evaluation methods that help them in clarifying costs and benefits of IT, even if they express the need for more insights into costs and benefits of IT?"

In Chapter 2 we discussed our ontological, epistemological and methodological position. From which philosophical background will we tackle the research question? We argued that the traditional conventional stance is inappropriate for developing a further understanding of IT evaluation employment, and we therefore opted for an interpretive constructivist stance. This led us to the case-study strategy as the research method for studying the employment process of an IT evaluation method at a Dutch insurance company.

In Chapter 3 we examined the literature on three distinct areas covered by the research question: literature on evaluation, employment of evaluation and organisations. We showed the complexity of each of these areas, all of which are bound together in this research. Understanding the employment of IT evaluation methods, within complex contexts such as organisations, requires a research methodology that is not limited (not reductionistic), but holistic in its approach and

includes notions of social, economic, political, cultural and historical perspectives. We tried to avoid general managerialistic and technical approaches to IT evaluation which demonstrate oversimplified views on IT evaluation, on how organisations (and decision makers) operate and how the processes of change ("employment") take place.

In Chapter 4 we discussed two theoretical foundations for analysis, namely the diffusion theory and the actor-network theory, to guide us in understanding the case study. The diffusion theory was considered a proper starting point for understanding, given the research paradox concerning the lack diffusion of IT evaluation methods. The application of this theory showed interesting nuances (e.g. the notion of re-invention) that could only be addressed by a more sophisticated version of diffusion than the traditional diffusion theory offered. This allowed us to address more appropriately the findings in our case study. However, some arguably more fundamental research findings (i.e. related to what gets employed and in what way) required an alternative analytical logic for understanding. To compensate for the limited understanding of complexity in diffusion theory, it was suggested we focus on the actor-network theory to aid us in gaining additional understanding. Although ANT has its own limitations, it was chosen to help explain the case and answer our research question.

In Chapter 5 the case study was described. We studied the context of the case study which was development in the environment and information technology in the Dutch insurance sector. A detailed account is given of the events that happened during the introduction of a new IT evaluation method at IIC, a Dutch insurance company. These processes of evaluation employment can be seen to have had quite a dynamic and profound impact on the organisation.

The case study results were analysed in Chapter 6 using the theoretical insights established in Chapters 3 and 4. The diffusion theory can be seen to provide a framework for describing the case, but also showed a lack of understanding with respect to explaining our paradox. Case specific details were discussed from an ANT perspective to argue that the evaluation method could be seen as an actor and the employment process an attempt to black-box it. It was argued that a process of

mutual translation took place whereby the results of the process did not equal the intended outcomes.

Finally, in Chapter 7 the research question was addressed based on the insights gained from the case study. The major findings that were addressed in that chapter are discussed in a subsequent section, after we have addressed the limitations of this research and offered suggestions for further research.

8.3 LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

In this section we address the limitations of our research with respect to our *case study* and to our *research* in general, which leads to suggestions for further research. With respect to our *case study*, we identify two limitations. In the first place, the evaluation method under study only focused on *ex ante* evaluation, where at the outset of our research it was intended to study an evaluation method that incorporated more stages of the life cycle (described in section 3.2.1). Though initial plans (see plans in IIC-PM 1997) as well as renewed contemporary developments at IIC also intended to include both continuous monitoring during the execution of IT proposals and IT projects as well as *ex post* evaluation, these were not in place during the time of the case study. Issues such as the dynamics of continuous evaluation and monitoring of IT projects, accountability for the IT investments results and consequent adaptations of evaluation methods have been underexposed. IIC gave priority to the initial (*ex ante*) stage of IT evaluation. Unfortunately, no case organisations were found that use an evaluation method that spans the whole life cycle. We do however believe that much of the new understanding our research presented will also apply to evaluation methods during the other life cycle stages. Further research should strengthen this assumption.

A second limitation was the fact that we were studying a phenomenon that is still very much on-going. No finite conclusions can be drawn about how which results the employment process will deliver. However it was argued in section 2.3.4 that this limitation was an opportunity as well. It allowed close interaction with the dynamics of process under study. Furthermore, this research suggests that the employment of

IT evaluation methods may be a long-term process for which finite conclusions may be very difficult to draw. The black-boxing of the evaluation method is constantly being challenged. Our research covered a period of 5 years, from 1996 to 2001. Still, we see that at IIC the evaluation method has not yet been black-boxed. Further research could provide more insight into the dynamic evaluation process such as conceptualised in this research. Additional new cases of longitudinal research could add to the understanding of the evaluation process in further uncovering attempts at black-boxing. An interesting on-going research could for instance be done by revisiting the IIC case and studying the developments since 2001.

A more fundamental limitation in our *research* can be regarded as the use of theories stemming from two different paradigms. In our research, we address two distinct theories, namely the diffusion theory and the actor-network theory. They have different fundamental assumptions relating to ontology and epistemology. Diffusion theory can be located on the spectrum of socio-technical theories, whereas actor-network theory is supported by the theory of the social construction of technology. Diffusion theory in its approach displays an ontological realist assumption. It aims to uncover elements or factors of both the technological and the social. It attempts to predict and control outcomes better. Though not denying emergent and uncertain properties of phenomena, in this attempt diffusion theory displays a linear cause-and-effect reasoning associated with a realist ontology. Its underlying assumption is that ultimately such uncertainties can be controlled if we have a better understanding of the phenomenon in which we are interested. Epistemologically it assumes that such understanding can come from a neutral observer who can uncover the mechanisms of the phenomenon. By contrast, ANT has an ontological constructivist assumption in that it assumes that the world consists of heterogeneous networks which are socially constructed, and actors who act from their interests and inscriptions and their interpretations of their environment. ANT, rather than assuming generalised facts that can be discovered about phenomena, is instead sensitive to their localised and situated specificities. Moreover, it denies differences between the social and technological and therefore differences in the alleged properties of each of them. Epistemologically it assumes that the researcher is far from unbiased in the research, but should play an active role in, for example, choosing the boundaries of the actor-

network and which events or developments are deemed relevant to the understanding.

A problem arising from adopting and further exploring both of these two distinct paradigms is that they may have influenced they way they are interpreted, which may have led to a simplistic understanding of them. Rather than applying diffusion theory to extend our knowledge of the influences in the employment of an evaluation method, we have used it mainly to open up questions which it does not address. Moreover, we have highlighted aspects of diffusion theory with respect to re-invention and perception of characteristics, two notions that did not originally play a central role in diffusion theory. The influences of ANT have led us to pay more attention to these notions, possibly to the detriment of other notions in diffusion theory (e.g. the role of change agent and social networks). Moreover, we have acknowledged on-going developments in the stream of diffusion theory (see section 4.2.5), many of which have brought more sophistication. Our use of ANT also has been affected. Elements that have been proposed by different researchers, many of whom are adhering to the assumptions similar to diffusion theory, have influenced the way we have shaped our narrative about the actors, actor-networks and black-boxing processes at IIC. Though trying to avoid a simplistic use of ANT, in some ways we might have not been true to the nature of ANT. We have used our interpretation of ANT which comes from studying its literature and discussing the concepts with other researchers. However, we had no prior experience with using ANT before this study (see section 2.4). Comparing our results with similar studies on the employment of an IT evaluation method can uncover and maybe overcome such limitations. Nevertheless, the exploration of both of these theoretical approaches has been part of our learning process. It is only in hindsight that we fully appreciate their differences.

Another limitation of our research is our focus on the employment of an IT evaluation method within an organisation. An issue that is outside the scope of this research is IT evaluation across organisations within a wider context. Notions of costs, benefits and risks of IT become more complex when they span the boundaries of one organisation. For example, issues such as 'where do costs and benefits occur?', 'how are they divided?' and 'who is accountable for them?' then become of

increased importance. Developments such as the phenomenon of globalisation (Giddens 1991; Hanseth and Braa 2000) drive the need for evaluation methods that consider issues outside the borders of the organisation. In our case we see this in developments at FGU, where at the time of the research preparations were being made to unify evaluation methods across all its members worldwide. Research in understanding the employment processes beyond the border of one organisation seems to us a topic that solicits further study. Such a study may find the notions developed in this thesis interesting. Additional theoretical insights such as institutionalism and structuration theory were suggested in section 7.3.3 to inform such studies and to overcome the difficulties arising from ANT's disregard for social structures.

8.4 RESEARCH CONTRIBUTIONS

8.4.1 Theoretical contribution

So what? After having conducted this study, what have we gained? Where does this leave us? To answer these questions, we go back to our starting point. At the initial stage of this research, evaluation methods were seen as neutral and passive tools that could be used to get a better grip on costs and benefits. Suggestions by other researchers to address the paradox as to why these tools are so difficult to employ often led to suggestions to better 'sharpen the tools' (e.g. Parker, Benson *et al.* 1988; Serafeimidis and Smithson 1995b; Gunasekaran, Love *et al.* 2001). For example, add more criteria (e.g. measure risk in addition to costs and benefits; also measure *intangibles*), define better what is meant by certain definitions (e.g. have a new definition on how the value of information can be measured), extend the scope of the method (e.g. to include life cycle evaluation) and shape the tool to certain contexts or types of information systems (e.g. use different criteria for different types of organisations or information systems). The lists of evaluation methods thus developed continues to grow – the question is: Who will be using them?

The diffusion theory suggests shifting the focus from solely perceiving the characteristics of the method to including the process of diffusion. Long lists of elements can be constructed to determine which are influential in the employment of IT evaluation methods (see section 3.3.4). Elements that not only relate to the method itself, but also to the *process* of employment and the *context* in which this

process takes place (Symons and Walsham 1991). We have argued that statistically determining which elements are most influential ('critical success factors') is inappropriate for such a complex, social phenomenon as the employment of IT evaluation methods by organisations. Generalisations fail to account for the highly situational and contextual aspects of the social phenomenon of our study. Instead detailed case studies, based on an interpretive stance, should provide insight into how evaluation methods are employed. With the background of an interpretive researcher, we are inclined to seek understanding of the interpretations the (human) actors involved give to the evaluation method and the process of its employment, and to understand how this shapes their actions. This approach however still views the method from a rather passive perspective: the method is being interpreted and acted on.

A critical perspective illustrates that the evaluation method is not actually as neutral as some would believe. It packs different worldviews and intentions and thereby shapes others. It is *inscribed* by them. But this inscription is not as fixed and definite as some critical researchers would argue. ANT shows that through the interaction between actors, an actor-network results. It is not one that is carefully blue-printed by a limited number of actors, but one that results from interactions between actors. ANT takes us further in understanding by giving the evaluation method an active role in the shaping of this network. We have argued the evaluation method could be viewed as an actor actively involved in the process of its employment. The evaluation method not only shapes the way it is appropriated and 'enacted' by its surrounding actors, but also appropriates these surrounding actors itself. The notion of *translation* in ANT shows that the evaluation method is assigning roles to its surrounding and constituent actors and it displaces them to new positions in the actor-network: actors are positioned to change their work processes, receive new responsibilities and gain novel prerogatives.

Looking beyond the unidirectional notion of translation, we have argued that a process of *mutual translation* takes place. The evaluation method is translating actors but is in fact translated itself as well. Inscriptions are not ultimately strong and deterministic; values, interests and beliefs not fixed. The employment of the method can be regarded as a 'battle' in its energetic acting of the actors, imposing their

interests on each other; but not with is negative connotation. The 'battle' is not something to be avoided, but arguably the natural process of IT evaluation employment. It denotes that something actually *is* changing; that the employment process and its associated organisational change are actually taking place. If such a battle was not evident, the process would only be symbolic, ultimately having no real impact.

Actors all act differently which results in an (unpredictable) emergent process. They find the weaknesses in the inscriptions and make use of them; they increase the strength of inscriptions and they follow anti-programs. What finally gets employed does not resemble the initial ideas and inscriptions of the evaluation method. Through time the evaluation method changes radically under the influence of a diversity of actors. This might even be the reason why in many cases the attempted employment of a method is said to have failed even though it often has had a significant impact in its translation of other actors, as was seen in our case study. Moreover, the actor-network does not become stable, but remains constantly challenged – actors (including the evaluation method) constantly attempting to translate each other further. To talk about the success or failure of the employment is problematic, since there is no end-point where one can say the method has been employed – it is constantly changing and being translated.

In sum, this thesis asserts that having come from a perspective where the evaluation method is a passive artefact, even a neutral tool, with innate qualities and proceeding on to an understanding of the evaluation method as an active actor, helps to understand the process of employment of an evaluation method. Difficulties in employing IT evaluation methods can be understood better if the method is perceived as an actor, who has to be acted upon, acts itself and finds ways to interest associated actors. We have demonstrated in our research that such a perspective gives a better understanding than the prior conceptions of IT evaluation methods. The focus on attempts of translations by all actors involved (including the method) is a good starting point to analyse and understand how the employment of evaluation methods takes place. It allows us to review the paradox of why organisations do not employ evaluation methods when clearly there seems reason to do so. Our new construction of evaluation and its employment resolves this paradox by arguing that it is not a

matter of whether organisations employ formal evaluation methods, but rather how they appropriate such evaluation methods in their situation. This appropriation results in emergent outcomes that are unlikely to resemble initial concepts. Outcomes in the employment of methods can be understood as situated cases of outcomes of *mutual translation* where actors (both the method and other actors) have been translated to varying degrees. Perceived failures are outcomes where such translations have not occurred, have failed (i.e. reversed translations) or have translated the evaluation method beyond recognition of its initial concepts.

This construction of IT evaluation ultimately gives us better understanding of the employment of IT evaluation methods in organisations. It does not provide a simple answer to our research question, but rather explains that the research question only is relevant in our old understanding of evaluation. Behind it hide too narrow views on evaluation (as being neutral and having innate qualities) and unrealistic assumptions on evaluation employment (expecting planned outcomes). In our new understanding, evaluation methods are not neutral neither are there generalised reasons (i.e. particular influential factors) that can account for difficulties in IT evaluation method employment; at least no reasons other than the old myopic view of evaluation itself. The paradox central to this thesis is solved by viewing evaluation methods as actors and their employment as emergent processes of black-boxing. This position gives us a better understanding of the use of IT evaluation methods in organisations.

8.4.2 Practical contribution

Our new conceptualisation of IT evaluation can be seen to have some practical implications. Viewing employment processes as emergent rather than processes that can be controlled and directed may lead to an uneasy feeling among practitioners and managers involved in IT evaluation. As was discussed in section 3.2.6, a shift from a conventional to a constructivist paradigm may lead to fear of loss of (alleged) control and certainty about outcomes of initiatives. Rather than offering widely applicable practical guidelines to improve the employment process, this study offers something else. It suggests that we should pay attention to the localities of IT evaluation employment processes. This includes a consideration of the inscriptions and

assumptions underlying the proposed evaluation method in order to understand why the method acts the way it does.

Furthermore, deviations from plans on the employment process should not be regarded as disruptive. Local adaptations and ongoing accommodations of evaluation methods are necessary to make and keep them relevant to particular contexts and situated work practices. These accommodations cannot be known upfront and typically have to be enacted *in situ*.

It should be noted that the new conceptualisation of IT evaluation must be related to other shifts in conceptualisations, such as what constitutes an organisation and how decision-making is conceived. For example, perceiving an organisation as a machine (e.g. one of the metaphors as described in section 3.4.2), evaluation methods are then considered tools that allow for better control of the machine. Decision-making in such a view is based on an attempt to improve the efficiency and effectiveness of the machine. From such paradigms, previous conceptualisations of IT evaluation are very reasonable and obvious. The implications of this research work the other way around, however. Adopting a conceptualisation of IT evaluation employment as an actor entails adopting a paradigm that views organisations as socially constructed entities and decision-making as having both overt and covert functions, in essence being pluralist rather than unitary. Thus one cannot simply adopt the view that evaluation methods are actors, but at the same time hold on to conceptualisations of organisations as machines or as unitary. The new conceptualisation of an employed evaluation method needs to be accompanied by a wider conceptual vision on related subjects such as organisations, evaluation and decision-making. It is only then that the new understanding of the IT evaluation employment process makes sense.

Appendix: Adoption–Diffusion in Information Systems Research

Some examples of empirical studies on the adoption–diffusion in information systems research - from Fitchman 1992 adapted by Lefebvre and Lefebvre 1996

Authors	Adoption–diffusion phenomenon	Source of data	Adoption–diffusion factors	Major results
Ball et al. (1987): *Data Base*	Adoption of *database-management systems* by industrial firms	Questionnaires from 24 members of the Boston Chapter of the Society for Information Management	*Organizational characteristics* (communication effectiveness, number of engineers and scientists in management, etc.) *IT group characteristics* (stage in Nolan's life cycle) *Information sources* (journals, advertisements, salespersons, technical staff, etc.)	Organizations with high R&D commitments and a large number of engineers and scientists in management are more likely to be early adopters
Leonard-Barton (1987): *Interfaces*	Adoption of *SSA* by individual system developers	Survey of 145 programmers, analysts and supervisors in three sites in a natural-resource firm	*Perceived innovation characteristics* (value, feasibility of use) *Organizational influences* (reward systems, support systems, client preferences) *Personal characteristics* (demography, skills, years of experience)	Client preferences, adopter attitudes, training in SSA strongly discriminate adopters from nonadopters Years of experience, perceived accessibility of consulting, supervisor desires, and acquaintance with an advocate are moderately discriminating
Raho et al. (1987): *MIS Quarterly*	Diffusion of *PCs* in industrial firms	Questionnaires from 412 (randomly selected) DPMA members	*Educational commitment* (uncommitted, passive, active, strategic as per McFarlan and McKenny's model)	Phase of diffusion significantly related to level of educational activities
Leonard-Barton and Deschamps (1988): *Management Science*	Adoption of an *expert system* by individual sales personnel	Telephone survey of 93 salespeople in dozens of sales sites of a multinational computer company	*Personal characteristics* (innovativeness, job-determined importance, subjective importance of task, task-related skills, software-use skills, sales performance) *Managerial influences* (perceived management support, management urging)	Management was more likely to be viewed as having "suggested" or "required" use of the system by people rating "low" on all personal characteristics (except software-use skills)

Davis (1989): *MIS Quarterly*	Study 1: Current use of *mainframe productivity software* by white-collar workers Study 2: Predicted future use of *PC graphics software* by MBA students	Study 1: Questionnaires from 112 users in IBM Canada's development laboratory Study 2: Questionnaires from 40 students attending a large university	Studies 1 and 2: *Perceived technological characteristics* (perceived usefulness, perceived ease of use)	Study 1: Perceived usefulness and ease of use, both highly correlated with self-reported current use Study 2: Perceived usefulness and ease of use, both highly correlated with self-reported predicted future use In both studies, ease of use appears to be a causal antecedent of usefulness, with little direct effect on use
Davis et al. (1989): *Management Science*	Current use and predicted future use of a *word-processing package* by MBA students	Two waves of questionnaires (14 weeks apart) from 107 MBA students attending a large Midwestern university	*Perceived technological characteristics* (perceived usefulness, perceived ease of use) *Expectations of salient referents* *Attitudes* *Behavioural intentions*	Perceived usefulness and ease of use have a significant direct effect on behavioural intentions over and above their effect transmitted through the mediating attitude construct Behavioural intention to use is significantly related to actual self-reported use
Gatignon and Robertson (1989): *Journal of Marketing*	Adoption of *laptop computers* by sales organizations	Questionnaires from 125 senior sales officers in US firms	*Adopter industry competitive environment* (concentration, price intensity, demand uncertainty, communication openness) *Supply-side factors* (vertical coordination, supplier incentives) *Decision-maker characteristics* (information preferences and exposure) *Organizational characteristics* (centralization, selling-task complexity)	Adoption is associated with high vertical integration and high supplier incentives in the supply industry and high industry concentration and low competitive price intensity in the adopter industry Decision-maker characteristics (preference for negative information and exposure to personal information sources) predict adoption
Huff and Munro (1989): *Journal of Information Systems Management*	Adoption of *microcomputers* by individuals	Personal interviews with several dozen microcomputer users	*Perceived innovation characteristics* (relative advantage, compatibility, complexity, trialability, observability)	Anecdotal confirmation that microcomputers diffused quickly because of favourable perceived characteristics

Brancheau and Wetherbe (1990): *Information Systems Research*	Adoption of *spreadsheet software* by individual accountants and managers	Questionnaires from 70 accountants and managers in 18 Fortune 1000 firms	*Adopter characteristics* (age, education, exposure to media, interpersonal-communication exposure, opinion leadership, external social participation, etc.) *Communication-channel types* (mass media or interpersonal) *Communication-channel sources* (external or internal to company)	Cumulative adoption follows S-shaped curve using logistic function Early adopters are different from later adopters, as predicted by Rogers (1983) Mass-media channel types–external sources are more important at the knowledge stage; interpersonal channel types–internal sources are more important during persuasion
Cooper and Zmud (1990): *Management Science*	Adoption and diffusion of *MRP systems* within industrial firms	Telephone survey of 52 members of the American Production and Inventory Control Society	*Innovative characteristics* (task–technology compatibility, technical complexity)	High task–technology compatibility (continuous manufacturing methods, make-to-stock marketing strategies) and low technological complexity (e.g., fewer parts per bill of material and per finished good) positively related to MRP adoption but not diffusion
Gurbaxani (1990): *Communications of the ACM*	Cumulative adoption of the *BITNET computing network* by universities	Quarterly BITNET Network Information Center records and other sources (1981–88)	Adoption modeled as a function of the number of previous adopters and the time	Three functions were used: Gompertz, logistic, and exponential. The logistic clearly provided the best fit with significant statistics for all model parameters
Gurbaxani and Mendelson (1990): *Information Systems Research*	Cumulative adoption of *IT* by US firms	Archival data on total IT spending by large US firms from industry publications (1960–87)	Adoption modeled as a function of the level of previous IT spending and the time	Three price-modified functions were used: Gompertz, logistic, and exponential. Confirmed that exponential (price) terms were significant in all three cases, implying that a purely behavioural explanation for IT adoption is incomplete
Kwon (1990): *ICIS Proceedings*	Diffusion of *IT* in the administrative offices of a southeastern university	Field survey of department heads, "opinion leaders," and "MIS coordination" for 74 administrative offices	*MIS maturity* (age, applications, equipment) *MIS climate* (management support, user involvement, management attitude) *Work-unit size* *Network behaviour* (centrality, sources, intensity, link sources, link intensities)	External-communication intensity positively correlated with IT diffusion for work groups with a favourable MIS climate

Nilakanta and Scamell (1990): *Management Science*	Initiation, adoption, implementation of *database-requirements analysis and logical-design tools* by industrial firms	Questionnaires from more than 70 lead database designers in 17 Houston-area organizations	Characteristics (perceived utility, skills to use, etc.) of 15 *information sources* (books, periodicals, etc.) and 13 *communication channels* (telephone, library, etc.)	Hypotheses linking characteristics of information sources and communication channels to diffusion not supported (only 12 of 90 regression coefficients significant at *P* values ranging from 0.05 to 0.15)

Note on abbreviations: DPMA, Data Processing Management Association; IBM, International Business Machines Corp.; ICIS, International Conference on Information Systems; MBA, master of business administration; MIS, management information science; MRP, material-requirements planning; PC, personal computer; R&D, research and development; SSA, structured systems analysis.

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